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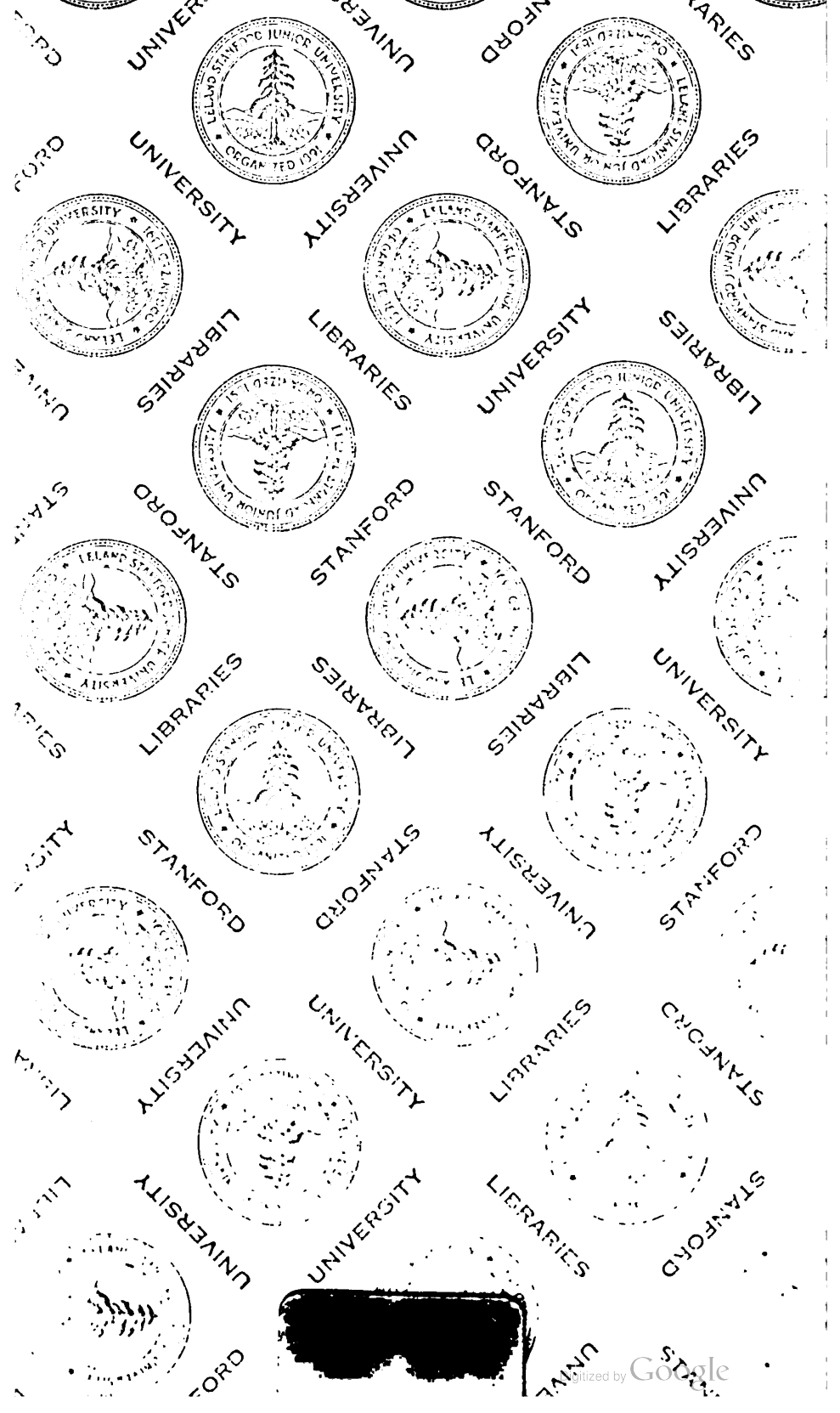
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AGRICULTURAL APPROPRIATION BILL, 1924

HEARING

BEFORE

SUBCOMMITTEE OF HOUSE COMMITTEE ON APPROPRIATIONS

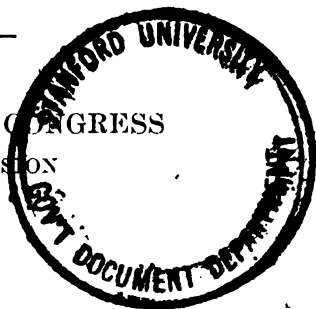
CONSISTING OF

MESSRS. SYDNEY ANDERSON (CHAIRMAN), WALTER W. MAGEE,
EDWARD H. WASON, JAMES P. BUCHANAN,
AND GORDON LEE

IN CHARGE OF THE

AGRICULTURAL APPROPRIATION BILL FOR 1924

SIXTY-SEVENTH CONGRESS
FOURTH SESSION



WASHINGTON
GOVERNMENT PRINTING OFFICE
1922

COMMITTEE ON APPROPRIATIONS.

HOUSE OF REPRESENTATIVES.

SIXTY-SEVENTH CONGRESS, FOURTH SESSION.

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CHARLES R. DAVIS, Minnesota.

DANIEL R. ANTHONY, Jr., Kansas.

WILLIAM S. VARE, Pennsylvania.

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AGRICULTURAL APPROPRIATION BILL, 1924.

HEARINGS CONDUCTED BY THE SUBCOMMITTEE (MESSRS. SYDNEY ANDERSON (CHAIRMAN), WALTER W. MAGEE, EDWARD H. WASON, JAMES P. BUCHANAN, AND GORDON LEE) OF THE COMMITTEE ON APPROPRIATIONS, HOUSE OF REPRESENTATIVES, IN CHARGE OF THE AGRICULTURAL DEPARTMENT APPROPRIATION BILL FOR THE FISCAL YEAR 1924, ON THE DAYS FOLLOWING, NAMELY:

THURSDAY, NOVEMBER 16, 1922.

STATEMENT OF MR. W. A. JUMP, BUDGET OFFICER AND ADMINISTRATIVE ASSISTANT, DEPARTMENT OF AGRICULTURE.

STATEMENT REGARDING FISCAL AFFAIRS OF DEPARTMENT.

Mr. ANDERSON. We will take up the office of the Secretary, on page 2 of the Book of Estimates, and Mr. Jump, who is the Budget officer of the department, will make a preliminary statement in respect to the items in the bill.

Mr. JUMP. Mr. Chairman, my remarks will be very brief. Before proceeding to the detailed estimates I would like to submit a statement which the Secretary, knowing the interest of this committee in the manner in which the affairs of the Department of Agriculture are conducted generally, asked me to present to you this morning. This is an excerpt from the Secretary's annual report for the last fiscal year, which was sent to the printer yesterday and which will be released, of course, in the usual manner when the regular session of Congress convenes. The statement deals with the reserves which were set up from the appropriations for the fiscal year 1922 and indicates typical instances of some of the economies which have been effected in the department. I shall be glad to read it, or I will present it for the record, whichever you prefer.

Mr. BUCHANAN. It will be satisfactory to me to have it inserted.

Mr. ANDERSON. Without objection, it will be inserted in the record.

STATEMENT FROM THE ANNUAL REPORT OF THE SECRETARY OF AGRICULTURE FOR THE FISCAL YEAR ENDING JUNE 30, 1922.

ECONOMIES EFFECTED IN THE DEPARTMENT.

In the administration of the work during the fiscal year the urgent necessity for economy in governmental expenditures has at all times been kept in mind by the officers and employees of the department. In conformity with the plan established by the Bureau of the Budget, reserves amounting to \$1,406,984 were set up against the various annual appropriations of the department.

By the exercise of strict economy at the close of the year the department was able to add further unused balances in the amount of \$678,749, and this, together with the \$1,406,984 reserved, made total savings of \$2,085,733 turned back to the Treasury in the form of unexpended balances from the annual appropriations.

In addition to the foregoing a reserve of \$559,569 was set up from the so-called continuing appropriations of the department, which are available until expended. While this money will eventually be expended, it was found possible under the necessities of the times to defer the expenditures beyond the present fiscal year, and thus for the present to save the withdrawal of the cash from the Treasury.

The efforts toward reduction in expenditures were not confined merely to keeping intact the reserves reported in the foregoing. The business administration of the department generally has been subjected to close scrutiny and specific economies inaugurated all along the line. The department has been actively represented on the various coordinating agencies created under the authority of the Bureau of the Budget. A traffic manager has been appointed to coordinate and handle the large volume of shipments and extensive passenger movements in connection with the work of the department. Careful attention has been given to economies which might be effected by changes in organization, and worth-while results have been achieved in this direction also, some of which will be mentioned later.

Particular attention has been given to the purchasing work of the department. After a survey of this work was made by an expert detailed from the Bureau of the Budget, a director of purchases and sales was designated to coordinate the purchasing work and the disposition of surplus property. Changes have been made in former procedure. The work has been placed upon a more businesslike basis by a closer scrutiny of purchase requirements. By reorganization and extension of the powers of the department board of awards competition has been widened on supplies and equipment bought. By consulting with commodity experts in this and other departments prior to purchasing the department has kept informed on market conditions in various lines and has been able to place orders more advantageously. The purchase of certain commodities has been centralized for Washington and near-by field stations, enabling the department to secure better prices by quantity orders.

Investigation is constantly being made into the availability of surplus property from other departments and its use wherever economical instead of the purchase of new equipment by the department. The stocks and equipment of the entire department itself have been gone over carefully, both in Washington and in the field, and under a system which has been established a large amount of surplus equipment for which the holding bureaus have no further use is furnished to other bureaus, thus avoiding additional purchases. Serviceable motor trucks have been secured at nominal costs from surplus stocks of other departments to replace worn-out trucks in the centralized trucking unit of the department, making better hauling service available to the bureaus at lower cost. The revenues from the sale of perishable products from the field stations of the department near Washington have been more than doubled by a special order issued during the year centralizing all such sales in the department's supply division.

To summarize, here, as elsewhere in the service, "Economy with efficiency" has been the watchword. The constant aim during the year has been to develop a consciousness on the part of each officer and employee of the department of the necessity and personal responsibility on his part for the maximum efficiency and economy with respect to his own particular work and the items of expenditure with which he may have to do. Economies and increased efficiency effected in this way in connection with the routine business operations of the department can not be adequately measured by figures, but they are of fundamental importance as the sound foundation of the whole economy program. The record of the year includes gratifying reports of this type and reflected increases in the efficiency of the lines of work affected. A few typical instances are interesting.

Reduction in manufacturers' price of automobiles and tires and tubes for field use taking place after proposals have been submitted to the department have been secured by the board of awards calling for revised prices instead of accepting the bids as originally submitted.

A department shop for the repair of awnings has been established at a saving of approximately \$3,000 a year. Facilities for the repair of typewriters

and bicycles by the department itself are being established at material savings over the prices formerly paid to commercial concerns for these services. The installation of new equipment in the central power plant of the department made possible a reduction in force of six firemen and one engineer and reduced the annual consumption of coal by approximately 400 tons.

In the fixed nitrogen research laboratory of the department a change of grate bars in one of the heating plants saved \$500 a year on the coal bill. By redesigning certain electrical equipment enough electrical energy has been saved to operate a battery of electrolytic cells to enable the laboratory to make its own hydrogen, effecting a saving of over \$4,000 a year in the purchase of liquid ammonia. This branch also effected a saving of \$13,000 during the year in reduction of personnel.

A revision of all of the mailing lists of the department conducted with the assistance of the United States Bureau of Efficiency resulted in the elimination from the lists of more than 100,000 names and addresses. One list of 8,000 names was discontinued altogether, saving 344,000 Government bulletins a year, or an annual expenditure of more than \$7,000.

The addressing and duplicating work for all of the bureaus has been consolidated under the Division of Publications, resulting in a reduction in personnel and the release of \$20,000 worth of machinery to the General Supply Committee for assignment to other departments. Better methods of management applied to the conduct of the duplicating work as a centralized activity have reduced the percentage of wastage of paper by 75 per cent.

Three separate periodical publications, The Market Reporter, The Monthly Crop Reporter, and the National Weather and Crop Bulletin were combined during the year into one periodical known as Weather, Crops, and Markets, and marked savings were thereby effected. Another periodical which duplicated much of the material sent out through the regular channels was discontinued altogether. A relatively expensive information service to the press was discontinued and in its place was substituted a more extensive service to newspaper syndicates at practically no expense to the Government. At the close of the year the department turned into the Treasury from the appropriation for printing and binding an unexpended balance of \$183,848.

In the Forest Service, a bureau having extensive field operations, an estimated saving of 25 per cent in its annual telegraph bill of \$10,000 is being accomplished through increased censorship. Through centralized purchase direct from producers savings of not less than 15 per cent are being effected from an annual expenditure exceeding \$300,000 on the purchase of smoked meats, canned goods, and dried fruits, and the quality of food used for the maintenance of field parties on road and trail work in the forests has at the same time been improved. Inspection and administrative trips are planned in accordance with carefully worked-out schedules in order to secure for the Government the advantage of specially reduced round-trip rates. By this means an average saving is made of \$50 per person traveling out of Washington for western points during the year. In order that the maximum amount may be available for the purchase of essential supplies and equipment for the field operations of the service, the purchase of office furniture has been stopped altogether. Seven thousand dollars have been saved in this way during the year and applied to the more urgent needs of the service. The headquarters of the bureau at one western point has been removed to cheaper quarters at an annual saving of approximately \$10,000.

In the Weather Bureau a demand for \$11,320 additional funds required to meet increased rental charges on expiring leases was met by reducing the number of rooms occupied by the field offices of the bureau involved so as to keep within the existing allowance for rentals. The same situation arose July 1, 1921, and was met in a similar manner, notwithstanding the offices of the bureau have been crowded thereby.

The consolidation of the Bureau of Markets and the Bureau of Crop Estimates on July 1, 1921, resulted in savings of approximately \$30,000 through the reduction of the personnel engaged on administrative work. A similar consolidation of administrative services was effected on July 1, 1922, when the Bureau of Markets and Crop Estimates was further merged with the Office of Farm Management and Farm Economics to form the new Bureau of Agricultural Economics, in which the economic work of the department is now centralized. It is estimated that an additional \$30,000 was saved in overhead expenditures by this consolidation. In addition, the consolidation has made possible the co-ordination of the work of various technical divisions of the three former bu-

reaus, thereby eliminating duplication and overlapping throughout the economic units.

In the Insecticide and Fungicide Board the field work has been redistricted, resulting in a saving of approximately \$1,500 a year without loss of efficiency.

In the States Relations Service, by the consolidation of the two Washington offices engaged in directing the work of agricultural extension, salaries aggregating approximately \$20,000 have been saved, and as the result of centralizing and rearranging the clerical work in the administrative offices of the same bureau salaries of clerks to the amount of \$8,000 have been saved.

One field office of the Bureau of Animal Industry was discontinued during the year and the work of that office consolidated with another, resulting in a saving of approximately \$4,000. Two divisions of the bureau in Washington were merged, resulting in the saving of the salary of one chief of division and one clerk, amounting to \$5,070. By consolidating the work of an employee on the Canadian border with the duties of another inspector, a saving of \$1,500 was effected, and the recall of one inspector from overseas has resulted in a further saving of \$3,300. In the meat-inspection service by realignment of the force the actual expenditure during 1922 was reduced several thousand dollars, notwithstanding the fact that nearly 1,000,000 more animals were slaughtered under inspection during the year and almost 300,000,000 more pounds of meat food products were reinspected, thus avoiding the necessity for additional appropriations. In the work of supervising the preparation of biological products a saving of approximately \$4,000 was accomplished through reduced travel. During the year there were produced 3,037,771 more doses of tuberculin than in the fiscal year 1921, and this was accomplished at a saving of \$20,885 over the amount expended during the previous year. The manufacture and distribution of blackleg toxin was also discontinued on July 1, resulting in a saving of \$10,000 per annum.

In the office of exhibits the agricultural displays have been prepared in such manner that they can be used a number of times without replacement, whereas formerly the department exhibits frequently were suitable for use only during one or two seasons.

In the Bureau of Biological Survey it was possible during the year to use \$20,000 of the money set aside as a reserve to enable the department in cooperation with one of the Western States to cope with a serious outbreak of rabies among coyotes which threatened to spread into other stock-producing States. As a result of the availability of the money previously reserved, the outbreak was brought under control. If the reserve had not been available it would have been necessary for the department to have asked the Congress for an additional appropriation in connection with this emergency.

The economies listed above are typical of the spirit in which the department has entered into the plan to conduct the business of the Government on the most economical and efficient basis possible.

While, as pointed out in the foregoing, we have been able to make a great many very substantial savings in money expended through the application of modern business methods, it is increasingly evident that the largest economies to be effected in the department are those which come as a result of efficient organization. Such economies can not be expressed in dollars and cents. They are measured rather by the larger effectiveness of the work and the amount of work done for the money expended. The reorganization which resulted in bringing three units into one in the Bureau of Agricultural Economics is a case in point. This reorganization effected considerable savings which can be measured in money, but altogether the larger savings have come through the increased efficiency and better administration of the work done in this particular field. I am quite sure that similar desired results will follow the reorganization of the extension work. This reorganization has had the careful study of the Assistant Secretary for a year past, and the final plan submitted is the result of that study. When put into effect, as we hope it may be, it will result in considerable saving of money, but, what is far more important, will greatly increase the effectiveness of the extension workers and the quality of the extension work.

(COMPARISON OF ESTIMATES FOR 1924 WITH APPROPRIATIONS FOR 1923.)

Mr. JUMP. The agricultural appropriation act for the fiscal year ending June 30, 1923, carried \$36,774,173. In addition, the deficiency act of July 1, 1922, carried a supplemental appropriation of \$155,000,

bringing the total for the fiscal year 1923 up to \$36,929,173 for that part of the work of the department ordinarily provided for in this way. At the very outset I would like to invite the attention of the committee to the fact that the estimates for 1924, as approved by the Bureau of the Budget, carry a total of \$36,031,613 for the items to which the regular agricultural act has previously been confined. This is the figure comparable to the \$36,929,173 carried for 1923 and to which I referred a moment ago, and therefore the estimates for the department proper contemplate a net reduction of \$897,560 over the appropriations available this year for the same purposes. There are decreases proposed which total \$1,561,640, and increases amounting to \$664,080, to which I will refer later, and in this way the \$897,560 net reduction is arrived at. I have undertaken to explain this in detail for the reason that in the estimates for 1924 as submitted these figures are not computed, and since they are really of the utmost importance in any consideration of the appropriations for the regular work of the department, it occurred to me that the committee would desire to have them before it at the outset. As you have undoubtedly observed, the total figure of the estimates is changed entirely over previous years, and this, of course, is due to a new departure, namely, the inclusion in the regular estimates of the recommendations for the actual appropriations, pursuant to existing authorizations, for Federal aid and forest road construction.

With this preliminary explanation I will proceed to a brief discussion of the Budget as a whole, containing, as I have indicated, not only the funds actually expended by the department but the large Federal funds administered by the department as well, as distinguished from those which it actually uses.

The estimates as approved by the Bureau of the Budget, contemplates, as the committee has seen, the appropriation of \$81,251,613 for all purposes. This is an apparent increase of \$18,839,577 over the total of \$62,412,036 shown in the estimates as the appropriations to date for the same purposes during the fiscal year 1923. But for the purpose of practical consideration it is a decrease of \$31,160,423, for the reason that while the \$50,000,000 appropriation authorized by the Post Office appropriation act for 1923 to be appropriated for Federal aid to the States in highway construction during the fiscal year 1923 has not yet actually been made, the language of the authorization is such as to empower the Secretary of Agriculture to make apportionments among the States and to enter into contractual obligations on that basis. It would seem, therefore, that the \$50,000,000 must be regarded in the same light as an actual appropriation in reckoning the funds for 1923. This would bring the total for 1923 up to \$112,412,036, which compared with the total of the present estimates, \$81,251,613, indicates the decrease of \$31,160,423 to which I have referred.

It seems important that this be taken into account, because the compilations which have been made of the actual appropriations for this year necessarily place the amount at \$62,412,036, and the estimates for next year at \$81,251,613. The \$62,412,036 figure, of course, is technically correct, but the \$50,000,000 authorization for Federal aid should be taken into account with it, since, pursuant to the language of the authorization, the apportionments have been made

among the States for 1923 and contractual obligations have been entered into. That is not true of 1924 and 1925, but it is true of 1923.

Mr. BUCHANAN. Will it not be true in 1924? Will you not have some more to charge up to the \$81,000,000?

Mr. JUMP. Yes; in 1924.

Mr. BUCHANAN. Then ought not that also be taken into consideration?

Mr. JUMP. Not so far as the present estimates are concerned, for the reason that the \$30,000,000 included in the Budget represents the amount which will be required to be appropriated for cash withdrawals from the Treasury during the fiscal year 1924, at the present rate of expenditures and without interference with the Federal-aid program indicated by the authorizations.

Mr. BUCHANAN. Then the economy comes from expending a less amount on the public roads?

Mr. JUMP. No, sir. The handling of the road appropriations is the factor which causes the material change in the total of the estimates over previous years, but I was not referring to it with the object of making the particular point of economy. I simply want to make clear that the estimates as submitted at this time do not actually contemplate the increase of some \$18,000,000 which the totals apparently indicate, but, on the other hand, contemplate a decrease. The gist of the whole thing, with reference to the matter of a decrease, is that the items which in previous years made up the regular Agricultural bill call for approximately \$900,000 less than the appropriations for this year for the same purposes.

ITEMS INCLUDED IN ESTIMATES FOR 1924.

Considering the Budget as a whole, the total of \$81,251,613 recommended for 1924 is made up in the following manner:

First, as I have explained previously, the items comparable to those formerly included in the regular Agricultural appropriation act carry a total of \$36,031,613. This is a net reduction of \$897,560 below the amount carried for similar purposes in the Agricultural act and related supplemental acts for the fiscal year 1923.

Second, the group of appropriations to which we refer as "Permanent, indefinite, and special" funds carries a total of \$12,220,000 for 1924, a reduction of \$30,000 over the current year.

Third, the committee, of course, is entirely familiar with the provision contained in the Post Office appropriation act of 1923, to which I have referred previously, and which authorizes appropriations for Federal aid to the States in road construction of \$50,000,000 for 1923, \$65,000,000 for 1924, and \$75,000,000 for 1925, and \$6,500,000 each for 1924 and 1925 for forest roads. The Bureau of the Budget has included \$30,000,000 Federal aid and \$3,000,000 for forest roads in the department budget for 1924. The remainder of the authorizations for 1924 presumably will be recommended when the rate of cash withdrawals from the Treasury seems to require it. This, I believe, is the point Mr. Buchanan had in mind a moment ago.

Mr. ANDERSON. Authorizations only?

Mr. JUMP. The provision in the Post Office act is for authorizations only. But the difference between the authorizations for 1924 and 1925, on the one hand and 1923 on the other, is, as I have explained, that for 1923 the Secretary is specifically authorized to make apportionments among the States and to enter into the contractual obligations.

Mr. ANDERSON. As I understand it, the reason for that is that in many States they require, before State funds can be spent, that there must be an allotment of Federal money to cover it?

Mr. JUMP. That is correct, according to my understanding.

Mr. ANDERSON. And the consequence is that the allotments have to be made of the Federal money prior to the actual appropriation?

Mr. JUMP. That is correct. This was done in order that the legislatures might have the benefit of it in the way you mention. Of course, I am only dealing with this in the most general way now; Mr. McDonald, the Chief of the Bureau of Public Roads, will go into this fully when he comes before the committee. I merely want to give an idea of the three general divisions into which the estimates may be classified.

STATEMENT SHOWING CLASSIFICATION OF ESTIMATES FOR 1924 AND APPROPRIATIONS FOR 1923.

To summarize the whole thing, we find that for practical consideration the estimates now submitted, as compared with the appropriations for the current fiscal year, are as follows:

(The table here submitted by Mr. Jump is printed in full, as follows:)

| | Appropriation, 1923. | Estimates, 1924. | Reduction. |
|---|----------------------|------------------|------------|
| Agricultural act and related supplemental acts..... | \$36,929,173 | \$36,031,613 | \$997,560 |
| Permanent, indefinite, and special funds..... | 12,250,000 | 12,220,000 | 30,000 |
| Increase of compensation (\$240, employees' bonus)..... | 3,232,863 | | 3,232,863 |
| Road work: | | | |
| Federal aid to States..... | 150,000,000 | 130,000,000 | 20,000,000 |
| Forest roads and trails..... | 10,000,000 | 3,000,000 | 7,000,000 |
| Total..... | 112,412,036 | 81,251,613 | 31,160,423 |

¹ The post office appropriation act for 1923 authorizes appropriations for Federal aid in road construction of \$50,000,000 for 1923; \$65,000,000 for 1924, and \$75,000,000 for 1925; and for forest road construction, \$6,500,000 each for 1924 and 1925. No appropriations have been made under these authorizations to date (Nov. 16, 1922). The Secretary of Agriculture is authorized to make apportionments among the States and enter into contractual obligations for 1923 on the basis indicated by the authorization for that year. The recommendation of appropriations of \$30,000,000 for Federal aid and \$3,000,000 for forest roads for 1924, according to the understanding of the department, is based on an estimate of actual cash withdrawals from the Treasury necessary on the basis of road construction indicated by the authorizations.

² Other appropriations for forest roads and trails are included in group 2 "Permanent, indefinite, and special funds."

NEED OF INCREASED APPROPRIATIONS FOR VARIOUS BUREAUS.

Mr. JUMP. Now, if I may do so, I would like to return to a further brief discussion of that part of the estimates which deals with what may be termed the regular work of the department. Despite the net reduction of nearly \$900,000 which has been made in this portion of the estimates provision is made with the approval of the Bureau of the Budget for a limited number of items, most of them involving

very modest amounts, but which the Secretary regards as of the utmost importance, because they deal with constructive research work, which the department—and I feel sure also the members of this committee—believe to be absolutely fundamental to the future prosperity, not only of the agricultural industry, but of the entire Nation. The work of scientific research, which has been so productive in the past, in developing improved practices and adding year after year to the economic wealth of the Nation is the basic work of the Department of Agriculture and the Secretary is very hopeful that the committee will give the most favorable consideration to the items in the estimates which provides small increases for certain lines of work under the heading. When it is taken into account that less than a fourth of the total appropriation for the regular work of the department is available for scientific research it is clear that this is the type of work which must receive increased support if the progress of the industry is to be assured.

The total amount of increases carried in the estimates is \$664,080, and as I have said before, these are offset, in the estimates as passed by the Bureau of the Budget, by reductions totaling \$1,561,640 below the 1923 appropriation.

In the Bureau of Animal Industry, for instance, we have increases requested of \$15,680 for animal husbandry investigation and \$15,000 for the dairy experimental work at the Beltsville farm.

Under the Bureau of Plant Industry we have listed here 10 projects which the chief of the bureau will take up in detail, totaling an increase of \$96,100. These particular increases have been selected with the utmost care from a long list of items which the department really regard as necessary, all of which we would feel warranted in taking up except for the present need for urgent economy in expenditure. These particular projects have been selected as the most urgent and we have kept them down to the very lowest amounts consistent with effective work. This may be said with equal force of each one of the items in the estimates.

Under the Forest Service we have three items, an increase of \$43,000 which we are asking for absolutely necessary improvements on the forests and experimental work on forest products.

The Bureau of Chemistry items include an increase of \$22,500 for agricultural investigations along chemical lines; \$20,000 for sirup and sugar work; and an increase of \$35,000 in connection with that important food and drugs act. The latter seems absolutely necessary in order to give the public and the better elements in the industries affected the protection contemplated by the act.

A small increase of \$5,000 is asked for the department library in order to purchase books, the lack of which greatly hampers the scientific work. In the Bureau of Agricultural Economics a total increase of \$251,200 is recommended to cover only the most urgent and important things which have been selected by the Secretary as those which it seems to him should receive attention at this time in connection with economic work. As you know, the Secretary has devoted a great deal of personal attention to the economic work in the time he has been in the department, and the increases asked along this line seem vitally necessary at this time. The increases referred to for the economic work include \$90,000 for the inves-

tigations in the marketing and distribution of farm products, \$25,000 for further strengthening the crop estimating work, \$15,000 for the foreign marketing investigations, \$20,000 for the administration of the warehouse act, \$1,200 for the standard container act, and \$100,000 to cover the increased duties along the line of inspection of perishable fruits and vegetables, especially to provide for the shipping point inspection. This latter increase of course will be offset by the receipts from the fees for the inspection service.

A similar increase, that is, largely reimbursable to the Treasury from fees, is recommended for the work of the Federal Horticultural Board, namely, \$70,000 for the enforcement of the plant quarantine act at the ports and on the border in connection with the importation of plants, protecting the Nation against insect pests and the plant diseases. Under the Weather Bureau an increase of \$33,000 is recommended, of which \$25,000 is for studies of the upper air and \$8,000 for central office and miscellaneous expenses. Slight increases of \$3,600 for the division of accounts and disbursements and \$11,000 in connection with the operation of Center Market are also recommended. An increase of \$43,000 is asked for the important work of the Bureau of Entomology in conducting its research to protect the country against dangerous insect pests.

These recommendations, as I have said before, amount to a total of \$664,080, and in the estimates as approved by the Bureau of the Budget they are offset by reductions which have been made in items that are carried in the regular bill totaling \$1,561,640. In other words, a net decrease of \$897,560 exists in the recommendations for 1924 over the appropriations for the current year.

REORGANIZATION OF CERTAIN DIVISIONS.

There are two other items in the estimates which the department regards as of the utmost importance. One is in the matter of reorganization within the department. Further progress has been made during the studies along this line during the year, and the Secretary is proposing for the consideration of the committee a carefully worked out plan involving the transfer of certain units, resulting, in brief, in the establishment of the agricultural extension work as a separate service in the office of the Secretary, the separation of the offices of experiment stations and the office of home economics from the present extension organization, known as the States Relations Service, with the home economics work to be established on the basis of a bureau in the department, and the experiment station work to be a separate office under the director of scientific work, the transfer of the editorial and distribution work of the division of publications into the office of the Secretary, and the transfer of the exhibit and motion-picture work from the division of publications into the proposed extension service. These proposed changes will be presented to the committee in a few moments by the Assistant Secretary, Mr. Pugsley, who has immediate direction of the public relations work of the department.

ADDITIONAL SCIENTIFIC AND TECHNICAL EMPLOYEES—INCREASES IN SALARIES.

Another item which the Secretary regards as of especial importance to the administration of the work of the department on a satisfactory basis is the slight increase recommended in the number of

scientific and technical employees who can be employed at the maximum salaries set for these grades. Doctor Ball, the director of scientific work, will give the committee the full details with regard to that item when it is reached.

I believe the Secretary has already assured the chairman of his willingness to come before the committee in connection with these items at any time you may desire, and of course he will be very glad to do that if you wish it.

REDUCTIONS IN STATUTORY ROLLS.

Before taking up the detailed estimate I would like to revert, for a moment, to the general subject of economy and at the same time clarify the situation with respect to the statutory rolls, as this is a point which will come up as we reach the various bureaus in the estimates. The matter to which I refer deals with reductions in statutory places. During the consideration of these estimates it became necessary at one stage to effect a considerable reduction in the total amount involved. The Secretary called upon the various branches of the department to make a survey and report to him the statutory positions which could be dropped, amounting wherever possible to 3 per cent or more of the total of statutory salaries, these positions, most of them in the lowest grades, to be dropped at the close of the current fiscal year. The Secretary has had the feeling that these forces could be reduced somewhat without impairment to the service, and you will note that accordingly statutory reductions, amounting altogether to \$157,620 and involving 198 places, are proposed all the way through the bill. A great many of the positions to be dropped are vacant and as the rate of turnover in these low grades is extraordinarily high most of the places that are filled will become vacant some time between now and July 1, 1923. A summary of this proposed reduction may be of interest to the committee, and if you desire I will insert it in the record. (The statement referred to follows:)

Statutory positions recommended to be dropped in estimates of appropriations for Department of Agriculture for fiscal year 1924.

| Name of bureau. | Number of places dropped. | Amount involved. |
|---|---------------------------|------------------|
| Office of the Secretary (proper)..... | 17 | \$16,540 |
| Offices of editorial and distribution work..... | 12 | 9,000 |
| Extension service..... | 6 | 5,880 |
| Bureau of Animal Industry..... | 27 | 21,930 |
| Bureau of Plant Industry..... | 17 | 15,900 |
| Forest Service..... | 32 | 21,720 |
| Bureau of Chemistry..... | 20 | 14,100 |
| Bureau of Soils..... | 3 | 2,800 |
| Bureau of Entomology..... | 5 | 4,200 |
| Bureau of Biological Survey..... | 2 | 2,700 |
| Bureau of Public Roads..... | 8 | 3,800 |
| Bureau of Agricultural Economics..... | 45 | 30,240 |
| Insecticide and Fungicide Board..... | 2 | 840 |
| Federal Horticultural Board..... | 2 | 1,920 |
| Total places dropped..... | 198 | \$157,620 |

RECEIPTS FROM ACTIVITIES OF DEPARTMENT OF AGRICULTURE.

In considering the matter of appropriations for the department I believe the committee will also be interested in the latest compilation of the direct receipts to the Treasury in connection with the activities of the Department of Agriculture which in all forms amounted to more than \$8,000,000 during the fiscal year ending June 30, 1922. The statement referred to was prepared in connection with the annual report of the Secretary for 1922, which will be released early in December and, if I may, I will insert it in the record for the information of the committee.

(The statement from the annual report of the Secretary of Agriculture for 1922 follows:)

DIRECT INCOME TO GOVERNMENT IN CONNECTION WITH WORK OF DEPARTMENT OF AGRICULTURE, FISCAL YEAR 1922.

Incident to the department's work during the fiscal year 1922, direct receipts aggregating \$8,403,394.05 were covered into the Treasury, and fines were imposed and judgments recovered by the courts amounting to \$168,769.36 in connection with the enforcement by the department of the regulatory acts which devolve upon it for administration and execution, as follows:

Receipts:

| | | |
|---|-------------------|-------------------|
| Deposited to credit of miscellaneous receipts fund— | | |
| From business on the national forests— | \$4, 628, 462. 42 | |
| From other sources— | 580, 902. 39 | |
| | | \$5, 209, 364. 81 |
| Deposited to credit of appropriation for regular work of department— | | 324, 081. 48 |
| Deposited to credit of appropriation administered by but not used in prosecuting regular work of department— | | |
| Reimbursement for cost of distributing surplus war materials to States for use in road-construction work— | \$323, 015. 85 | |
| Repayments by farmers of seed-grain loans— | 668, 742. 77 | |
| | | 991, 759. 62 |
| Deposited to credit of special funds of Forest Service (from business on the national forests) — | | 1, 878, 188. 14 |
| Total receipts— | | 8, 403, 394. 05 |
| Fines imposed and judgments recovered by the courts in connection with violations of statutes intrusted to Department of Agriculture for enforcement— | | 168, 769. 36 |
| Total direct income to Government resulting from activities of Department of Agriculture— | | 8, 572, 163. 41 |

OFFICE OF THE SECRETARY.

STATEMENT OF MR. R. M. REESE, CHIEF CLERK DEPARTMENT OF AGRICULTURE.

SALARIES.

Mr. REESE. I will begin on the sixth line of the statutory roll. The italics indicate the proposed changes. We are recommending the transfer of 14 places from the rolls of other bureaus of men permanently needed in the Secretary's branch and which are carried on lump rolls, with corresponding reduction on all the rolls affected.

TRAFFIC MANAGER.

Mr. ANDERSON. Where do you get this traffic manager at \$3,000?

Mr. REESE. By direction of the Bureau of the Budget the Federal Traffic Board was created, with instructions to each of the departments to appoint a representative on that board. The Secretary appointed the traffic man of the department as representative on the board. The business of the Federal Traffic Board developed so rapidly, and its results are so useful that the representative of the Department of Agriculture on the Board was designated traffic manager to deal with all the varied traffic problems of the department, to advise shipping clerks of the proper routings, proper classification of freight, the correct freight rates, and other traffic problems.

Mr. ANDERSON. Is there any authority of law for this place?

Mr. REESE. I take it the authority is the Secretary's general administrative authority under the act of March 4, 1907, to make appointments on lump-fund appropriations. This would put it in the law.

Mr. ANDERSON. No; it would not. That is a transfer.

Mr. REESE. It is a transfer from the lump-sum appropriation for the enforcement of the plant quarantine act.

Mr. ANDERSON. What is your next item?

ADMINISTRATIVE ASSISTANT.

Mr. REESE. The next item is the transfer of one administrative assistant at \$3,000.

Mr. ANDERSON. Where do you get him from?

Mr. REESE. We take him from the Bureau of Entomology appropriation for preventing the spread of moths.

Mr. ANDERSON. What does he do?

Mr. REESE. This is Mr. E. H. Bradley.

Mr. JUMP. Mr. Bradley handles special assignments under the Secretary's office. He assists in the preparation of the annual estimates, keeps track of legislation pertaining to the work of the department, compiles special statements, reports, etc. He has been employed in this capacity for some time.

Mr. REESE. The next change is the change in designation from executive clerks to executive assistants, the object being to make a uniform designation for a group of employees performing responsible work at varying salaries. There are three positions at \$2,500 each, two transferred from farmers' cooperative demonstrations and the other meat inspection.

Mr. ANDERSON. Are these people employed in the Secretary's office now?

Mr. REESE. They are, and will be permanently employed to carry on the work of that branch.

BRANCHES OF WORK UNDER OFFICE OF THE SECRETARY.

I should like to say, to prevent any misapprehension concerning the phrase "the Secretary's office," that it is not limited to the immediate office of the Secretary of Agriculture. It means the Secretary's branch, which includes at the present time the immediate office of the Secretary, the offices of the Assistant Secretary, the director of

scientific work, and the solicitor, as well as the offices of the chief clerk, personnel, and inspection, mechanical superintendent, etc. It is an administrative branch which, for brevity, we speak of as the office of the Secretary, but I would not like to create the impression that that is the Secretary's immediate office only. These represent the general administration and operation of the department.

Mr. ANDERSON. Is any part of it dependent upon change in the extension service items?

Mr. REESE. No; only the director of the extension service is set forth above. Doctor Pugsley will speak to that. What I have dealt with, so far, are the men employed for the work of the Secretary's branch.

TRANSFERS FROM OTHER DIVISIONS AND LUMP-SUM ROLLS.

(See p. 14.)

The next item is two executive assistants at \$2,250 transferred one from the statutory roll of the Bureau of Agricultural Economics, and one at \$2,000 from the lump roll of the Bureau of Chemistry; a private secretary to the director of scientific work, \$2,250, transferred from the lump roll of farmer's cooperative demonstration work.

There is a misprint in the thirteenth line down after "5 at \$2,000 each." What should follow is "one attorney, \$4,000, [one] two at \$3 500."

Mr. ANDERSON. You have heretofore explained the private secretary to the director of scientific work?

Mr. REESE. I referred to that. That is a transfer from the lump roll. There is no other change until you get down to the thirteenth line—five law clerks, at \$2 000 each.

Mr. ANDERSON. I understand the remainder of that line goes out?

Mr. REESE. Yes.

ADDITIONAL EMPLOYEES.

Mr. ANDERSON. Next is law clerks, 4 at \$3,000 each, 2 at \$2,750 each, and 2 at \$3,500.

Mr. BUCHANAN. That will make two new places, one at \$4,000 and one at \$3,500?

Mr. REESE. That is correct, sir.

Mr. ANDERSON. Are persons now employed at these salaries in the solicitor's office?

Mr. REESE. There is one at \$3,500.

Mr. ANDERSON. But the other two places do not exist?

Mr. REESE. The other two places do not exist, and we want to create them. In that connection it ought to be pointed out that we are dropping out of the solicitor's office five at \$2,000, \$10,000 in all. So that this represents a reduction of \$2,500 in that staff. The solicitor will, if desired, speak to his needs on that subject. They are, in brief, and we can not secure qualified lawyers for the complicated work of the department at \$2,000.

Mr. ANDERSON. There is no statutory authority for the employment of these persons at these salaries, except the general authority

of the Secretary to employ persons to do the work of the Department of Agriculture.

Mr. REESE. That is true. That general authority is found, as to positions on lump-sum appropriations, in the act of March 4, 1907, referred to above.

Mr. BUCHANAN. Let me ask you one question about these transfers. Are they all transferred to the Secretary's office at the same salary they are now receiving?

Mr. REESE. Yes, sir; all at the same salaries they are now receiving. There are no promotions.

Mr. ANDERSON. The net result of this is that you drop five law clerks at \$2,000?

Mr. REESE. Yes; and appoint one attorney at \$4,000 and one at \$3,500, making \$7,500.

Mr. ANDERSON. Are any of these five places that you now have at \$2,000 filled?

Mr. REESE. Only one.

TRANSFERS FROM OTHER DIVISION AND LUMP-SUM ROLLS.

(See p. 13.)

The next change comes down at the fourth line at the bottom, transfer of one clerk, class 3, at \$1,600, and one clerk, class 2.

Mr. ANDERSON. Is that a transfer?

Mr. REESE. Yes; these are all the same kind of transfers, from bureau lump-sum rolls, with rolls reduced accordingly.

The next item, as explained, is in the next to the last line, four clerks at \$1,000 reduced to three. We have changed the designation of one of those employees to skilled laborer, for the reason that he is a skilled laborer now carried in a clerk's place by authority of the Civil Service Commission. It should be changed to agree with the actual facts.

In the next place, there are four at \$900, reduced from six. One of those was changed for the same reason, a skilled laborer now carried in a clerk's place by authority of the Civil Service; and the other is dropped, as set forth later in these notes.

One accountant and bookkeeper, \$2,000, is transferred from the Secretary's office to the Bureau of Agricultural Economics, where he is now employed.

Page 3, one skilled laborer, at \$1,000, is transferred from the Bureau of Animal Industry for the same reason, he is working for the Secretary's branch; six messengers or laborers, at \$600, reduced to four. One is a change in designation to a messenger boy, now occupying the place; the other is dropped.

WATCHMEN AND LABORERS.

Fifty-two watchmen are reduced to 51; one place is dropped.

One skilled laborer at \$1,200 is transferred from the Bureau of Soils, for the same reasons as the others.

Four skilled laborers increased to five. That provides for transfer of the man I have referred to above, whose designation is changed from clerk to skilled laborer.

Mr. ANDERSON. What is this skilled laborer at \$1,200; what does he do?

Mr. REESE. The man really has a clerical status; he is working for the Assistant Secretary.

Mr. ANDERSON. He is not a mechanical employee?

Mr. REESE. No. Seven messenger boys increased to eight—that refers to the change just above, where one at \$600 was changed in designation. Nine messenger boys reduced to seven, at \$480 each; two are dropped.

Charwomen, three at \$480 are dropped; 14 charwomen, \$240, reduced from 16—2 are dropped.

Page 69 of these notes refers to the list of places dropped in the office of the Secretary aggregating \$16,040.

Mr. BUCHANAN. Speaking of this skilled laborer at \$1,200, now doing clerical work, is it practical for the department to put a skilled laborer under a statutory roll doing clerical work?

Mr. REESE. I should modify that statement, perhaps, in this way: He is not doing exclusively clerical work, but clerical work in addition to his other duties. He has a clerical status.

Mr. BUCHANAN. Is he employed as a skilled laborer or under his status for clerical work?

Mr. REESE. He is employed in both ways, if I can make myself clear. He does some work as skilled laborer and incidentally clerical labor. There is no impropriety from the civil service in carrying a clerk as a skilled laborer if the employee is willing.

Mr. BUCHANAN. No; but is there not impropriety in carrying a clerk on a statutory roll as skilled laborer?

Mr. REESE. No.

Mr. BUCHANAN. Then you could put all skilled laborers at clerical work, as I understand it.

Mr. ANDERSON. Not unless they had a civil-service status.

Mr. REESE. Not unless they had civil-service status. This man has.

Mr. BUCHANAN. And employed as such?

Mr. REESE. Partly as clerk and partly as skilled laborer. We could not use skilled laborers as clerks unless they had clerical status, which he really has.

Mr. BUCHANAN. Of course, he has a higher status than skilled laborer?

Mr. REESE. There are quite a few skilled laborers at \$1,200 scattered through this book.

Mr. BUCHANAN. I just thought that under the civil service rules and regulations that a man has to be one or the other; he can not be both.

Mr. REESE. That is a natural and a proper question. The fact is that he was a skilled laborer and doing skilled labor work. He passed the clerical examination, as his work developed, giving him a clerical status.

Mr. BUCHANAN. But he was not employed or assigned to any duty after his examination; he just passed it and the department kept him on the rolls as skilled laborer and put him at clerical work?

Mr. REESE. More or less clerical. He does not spend his whole time at clerical work; he does it incidentally.

Mr. MAGEE. He is a skilled laborer with civil service status of clerk?

Mr. REESE. Yes. There is nothing else on that statutory roll we care to speak about.

Mr. BUCHANAN. All of these people that have been transferred from other rolls to the Secretary's branch have been dropped on those other rolls?

Mr. REESE. Yes, sir.

Mr. BUCHANAN. And no additional employees are required in the department or bureau from which they have been dropped?

Mr. REESE. No; they have been working right along for the Secretary's office, and the appropriations—

Mr. BUCHANAN (interposing). I mean, in the estimates in force now there are no additional employees requested to take their places?

Mr. REESE. No.

DECREASES IN STATUTORY ROLLS OF DEPARTMENT.

Mr. JUMP. As a matter of fact, Mr. Chairman, the department is recommending decreases in the statutory rolls in the net figure of approximately 200 places, amounting to \$157,000. During the consideration of the estimates it became necessary to effect a considerable reduction, and the Secretary required the bureaus to make a survey and indicate a list of statutory positions amounting as nearly as possible to 3 per cent of the personnel on the statutory roll, these positions, most of them in the lowest grades, to be dropped at the end of this fiscal year. The Secretary has had the feeling that these forces could be reduced somewhat, and as a result of that you note these statutory reductions all the way through the bill as the various units are reached, dropping positions from the routine grades on the statutory rolls.

MECHANICAL SHOPS AND POWER PLANT.

Mr. ANDERSON. The next item, page 5, miscellaneous expenses.

Mr. REESE. Referring to page 4 just a moment, if you please: Salaries and compensation of necessary employees in the mechanical shops and power plants of the Department of Agriculture. It is recommended that that proviso be dropped as permanent legislation—"that hereafter." That is the only change. The amount is the same.

MISCELLANEOUS EXPENSES, DEPARTMENT OF AGRICULTURE.

Mr. ANDERSON. The next item, page 5.

Mr. REESE. Miscellaneous expenses. There are two things there. The italic lines indicate authority for maintenance, care, and operation for automobile for official use of the Secretary of Agriculture. It was thought better to get that specific authority in this place.

Mr. ANDERSON. As I recall, under this item last year we authorized the purchase of an automobile and appropriated \$5,000 for that purpose.

Mr. REESE. That was done.

Mr. ANDERSON. You propose now to drop the item?

Mr. REESE. Yes; the last three items of this paragraph indicate the dropping out of that \$5,000.

PAYMENT OF DUTY ON SCIENTIFIC APPARATUS IMPORTED.

The only other change there is the duties on imported articles. Under the present tariff law the department will have to pay duties on scientific apparatus imported from other countries.

Mr. ANDERSON. You will have to pay duties?

Mr. REESE. We will have to pay duties.

Mr. ANDERSON. What do you want to drop that language out for then?

Mr. REESE. For the reason that under the comptroller's decisions those duties may be paid out of any lump-sum appropriation. The various bureaus import some of their scientific apparatus, and it makes a better accounting system to have the duties paid out of their own appropriations rather than to have it come out of miscellaneous expenses.

Mr. ANDERSON. You do not make any deduction from this appropriation with that idea?

Mr. REESE. No; we do not.

Mr. JUMP. You have not had to pay these duties heretofore?

Mr. REESE. No.

Mr. ANDERSON. You have had the provision, but you have not had to pay anything under it?

Mr. REESE. No. It is a matter of no great importance. We thought we could drop this out of here, but it could stay in.

COMPLETION OF VAULT FOR INFLAMMABLE MATERIALS.

Page 7: That paragraph authorizing construction of a vault for inflammable materials is dropped. The vault is nearly finished.

Mr. ANDERSON. You think it will be finished before the end of this fiscal year?

Mr. REESE. It will be finished inside of a few weeks.

Mr. ANDERSON. Where is this vault?

Mr. REESE. It is constructed on a knoll just about south of the department shops.

Mr. ANDERSON. How big is it?

Mr. REESE. It is about 30 by 25 feet.

Mr. ANDERSON. Underground?

Mr. REESE. It projects 2 or 3 feet above ground. The portion which projects above ground will be protected by shrubbery so that it will not show at all. There is very little above ground.

Mr. ANDERSON. What did the vault cost?

Mr. REESE. \$2,500.

Mr. ANDERSON. Was it built under contract?

Mr. REESE. Yes. The law limited the cost to \$2,500, and it was built under contract for that figure.

RENTED BUILDINGS IN DISTRICT OF COLUMBIA.

Mr. ANDERSON. The next item, page 8, is rented buildings in the District of Columbia.

Mr. REESE. We recommend a reduction of \$5,000 in that appropriation. We found last year that \$5,000 was not expended, and we believe we can safely drop that amount out this year.

Mr. MAGEE. Do you expect to rent the same buildings for the fiscal year as last year?

Mr. REESE. Practically. On the 1st of July last year by direction of the Public Buildings Commission we gave up the building on F Street, occupied by the office of foreign seed and plant introduction, and moved them into quarters in the auditor's building owned by the Government. It is quite possible that before the end of this fiscal year or during the next fiscal year some other shifts of that kind will be made. But we can not possibly tell in advance what will happen along that line.

Mr. ANDERSON. My recollection is that you were rather skeptical last year about being able to get along with the appropriation you had.

Mr. BUCHANAN. They have increased the estimate.

Mr. REESE. The appropriation last year was increased.

Mr. BUCHANAN. Increased over the estimate?

Mr. REESE. Increased over the estimate, because demands for increased rents came after the estimates had left my hands.

Mr. ANDERSON. Did you make a new lease on that Forest Service Building?

Mr. REESE. Yes, sir.

Mr. ANDERSON. What was that made at?

Mr. REESE. \$35,000.

Mr. ANDERSON. What were you paying previously?

Mr. REESE. \$22,800.

Mr. ANDERSON. And this was included in your last year's appropriation—\$6,000 motion-picture laboratory. Has that lease been consummated?

Mr. REESE. The building is not yet finished; it is under construction now. We expect to have it finished in the course of the next month.

Mr. ANDERSON. Have you made a lease on it?

Mr. REESE. We have made a contract to lease it as soon as it is finished at \$9,000 a year.

Mr. ANDERSON. That is \$3,000 more than you figured last year?

Mr. REESE. Yes. That is because of a change in the plan of the building, an increase in size, and the impossibility of getting builders to consider anything whatever, unless they get a reasonable return on the present high cost of building.

RENT OF BUILDING FOR STATES RELATIONS SERVICE.

Mr. ANDERSON. Then you had \$4,000 rent of building for States Relations Service.

Mr. REESE. The lease on that large building at 220 Fourteenth Street expired the 30th of last June, and the owner declined to renew the lease unless he got a little more money. All these real-estate men are putting up the plea that taxes have heavily increased, and they are somewhat increased; and such of them as are carrying loans on their buildings say they have had to renew them at higher rates of interest than they had to pay when they made the original loan.

Mr. ANDERSON. Has this lease been made?

Mr. REESE. Yes, sir.

Mr. ANDERSON. At what rate?

Mr. REESE. At \$24,000.

Mr. ANDERSON. What were you paying previously?

Mr. REESE. \$20,000.

Mr. MAGEE. Why do you figure that you need less money for rent with greatly increased rentals?

Mr. REESE. One reason I mentioned just now. We have given up one building on F Street for which we were paying \$8,500.

Mr. BUCHANAN. That increase was taken up by increased appropriation last year—there was over \$22,000 increase in the appropriation last year, even over the estimate. And over the preceding appropriation it was more than that—\$26,000.

Mr. REESE. One of the increases estimated for last year was not used—that is, for the motion-picture library.

Mr. ANDERSON. But it will be this year?

Mr. REESE. It will be this year.

Mr. ANDERSON. So that would not account for any increase in the appropriation. We would like to know how you effect this reduction in the appropriation.

Mr. REESE. The appropriation for this year is \$181,000. That is all absorbed in rentals with the exception of \$5,462, which we keep in reserve for emergency rentals, and an estimated reserve of \$5,000, set up this year at the request of the Budget Bureau. That last \$5,000 we can cut out, and we are cutting it out of this appropriation.

Mr. MAGEE. You need less space now than you have needed heretofore?

Mr. REESE. No.

Mr. MAGEE. I can not just figure out myself how you can pay these greatly increased rentals with the same amount of money.

Mr. REESE. We obtained increases last year to provide for some of these.

Mr. MAGEE. You did not pay them, though?

Mr. REESE. We have occupied a lot of space in the temporary buildings during the last year also. I am afraid I am not entirely awake to the information you want to get.

Mr. MAGEE. You are paying these increased rentals with the present appropriation?

Mr. REESE. We are paying them now.

Mr. ANDERSON. What we are trying to get at is this: You had an increase in this appropriation last year of \$22,000 or thereabouts, all of which we absorbed by increased rentals this year. For next year you are proposing a decrease of \$5,000. We would like to know how you are able to make that reduction?

Mr. BUCHANAN. Maybe that is the \$5,000 budget reserve.

Mr. REESE. That is the \$5,000 budget reserve item. We are cutting that out.

Mr. ANDERSON. Then you did not need as much money last year as you asked for. You have got to take one horn of this proposition or the other. Either you have asked us for more money last year than you needed or else you have done something which makes it possible for a reduction this time which you did not anticipate last year.

Mr. REESE. It is a fact that we got more money last year than we estimated for when the estimates were made. The demands for in-

creased rentals came in after that time. They were allowed by the Senate and conference committees.

Mr. MAGEE. How long do you make these leases for?

Mr. REESE. The leases under the law run for the fiscal year, but we secure in each case the option of renewal by the department for a certain number of years beyond that—from 5 years up to 10 years, as the case may be.

Mr. MAGEE. What did you do in the case of the Forest Service?

Mr. REESE. In the case of the Forest Service we secured the option of renewal for 10 years; in the case of the other building at 220 Fourteenth Street, the same, option to renew for 10 years longer.

Mr. JUMP. Mr. Chairman, may we go back for a minute to the statement that we really asked for more money last year than we needed? I think the real point is this: If it had not been for the fact that we were able to move offices out of the Homer Building at Thirteenth and F Streets, which is, of course, in a very expensive section, down to a Government-owned building at Fourteenth and B Streets, we would have had to continue paying rent at the Homer Building, and that would have eaten up this amount, and more.

Mr. ANDERSON. What were you paying there?

Mr. REESE. \$8,500.

Mr. JUMP. That explains the whole thing. We were able to move, however, from the Homer Building into the auditor's building, so we do not have to pay rent for those offices this year. But we did not anticipate that at the time the estimates were submitted last year. If that had not been the case, it would not have been possible to make any reduction this year so far as we can see.

PASSENGER-CARRYING VEHICLES.

Mr. REESE. Turn to page 322. This is an authorization, not an appropriation, for passenger-carrying vehicles. It is proposed to authorize expenditures from the lump sums of the department for the purchase, maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles necessary in the conduct of the field work of the department outside of the District of Columbia. This provides for purchases not to exceed \$32,000, used only for official service outside of the District of Columbia. The proviso that the Secretary shall report to Congress showing the amount expended is dropped.

Mr. ANDERSON. Why do you want to cut that out?

Mr. REESE. I guess Mr. Jump will have to answer that question.

Mr. JUMP. When the estimates were compiled it was regarded as permanent legislation, providing that the Secretary shall on the first day of each session make a report to Congress, and the report will continue to be made.

Mr. ANDERSON. It was never considered so before. It has been carried as long as I can remember. I do not know of any reason why it should not be made permanent law.

Mr. JUMP. In framing these estimates we endeavored to simplify them as far as possible and to omit what was regarded as superfluous language, which accounts for the dropping of this proviso. The department, however, will of course continue making reports. It

really makes no difference to the department whether the language remains or is stricken out.

Mr. ANDERSON. Very well.

USE OF PASSENGER-CARRYING VEHICLES TRANSFERRED FROM WAR DEPARTMENT FOR OFFICIAL PURPOSES.

Mr. REESE. The next language in italics provides for authority of the Secretary to purchase from appropriations made for cooperating with the States in the construction of roads or highways of motor-propelled passenger-carrying vehicles to replace such vehicles transferred from the War Department under authority of the acts cited. Those are the acts providing for transfer of surplus war equipment to the department through the Bureau of Public Roads. Mr. McDonald will have to explain that in detail. The last proviso is the one in which I am most concerned. The Secretary of Agriculture is authorized to use from any surplus war material turned over to him for distribution to the States for road building purposes such passenger-carrying vehicles as may be necessary for official use of the department in the District of Columbia.

Under the law, as I understand it, 10 per cent of the material turned over by the War Department to the Bureau of Public Roads may be retained for road building purposes by the Secretary of Agriculture in the construction of forest roads and trails. The authority proposed here would authorize the Secretary to use some of those cars for passenger-carrying purposes in the District of Columbia for necessary official use in the department.

Mr. ANDERSON. At one place here you propose to buy automobiles to replace the ones already gotten from the War Department?

Mr. REESE. In the field.

Mr. ANDERSON. In the next place you propose to take some of those automobiles and use them in the District of Columbia. Where do you get anything out of that except a lot of language?

Mr. REESE. We are proposing to permit the department to buy cars to replace those which are worn out in service, which have been transferred from the War Department.

Mr. ANDERSON. I understand that. But if you have got to buy cars to replace those, where do you make anything by taking some of those to use in the District of Columbia?

Mr. JUMP. That first proviso has to do with the extensive field work of the Bureau of Public Roads. It has no relation whatever to the second proviso.

Mr. ANDERSON. I think it has.

NEED FOR ADDITIONAL AUTOMOBILES.

Mr. JUMP. It was not so designed, for this reason: The second proviso was prepared at the Secretary's direction, without regard for the first one, contemplating that the few machines that are necessary for use by the department in Washington would not be exchanged for new machines at all, but would be old machines taken from the surplus stocks of the War Department, which are retained in the department under the provision of the law governing the distribution of road materials to the States. The two things are not

related at all, although I can readily see that it might appear from the language that they are. That can be remedied, of course, by making the language more explicit.

Mr. ANDERSON. The two items are not related, but it is all one proposition, because you either buy one place or another. I can not see any use of putting in a lot of language and providing a lot of changes when you have got to buy machines anyway.

Mr. JUMP. I am not well enough informed personally as to all of the reasons which make the first proviso necessary. Mr. MacDonald will go into that in detail, however, when he comes before the committee. With respect to the second proviso, however, under present conditions at the department, with the bureaus occupying some 40 buildings in widely scattered sections of the city, and with the numerous outlying experiment stations, all of them necessary for different purposes, it is absolutely necessary to have machines for official use in order to transact business and to accommodate people who visit the department on Government business of such nature that they should not have to spend all day running around from one part of the city to another to reach the place they want to find and which it is to the Government's interest that they do find without undue aggravation. It is equally desirable to provide the department some way of getting out to the experimental farms. For instance, two members of the Board of Estimates of the Budget Bureau who went over these estimates desired to make an inspection of the Beltsville experimental farm of the Bureau of Animal Industry. The way we handled that was by calling on the Bureau of Public Roads for the use of one of their cars to take them out there and bring them back.

From time to time during the year we have distinguished visitors who come to this country, as well as our own people who come from the various States, and their status is such that it is desirable to show them some of the work done at the outlying experimental farms. Sometimes the department desires their judgment and advice. In such cases we are obliged to go to the Bureau of Public Roads and ask them to send over one of their cars.

Mr. ANDERSON. Where are you embarrassed by having to do that?

Mr. JUMP. We are not embarrassed in making the request on the bureau, as it is a part of the department the same as any other branch, and under the direction of the Secretary, but the bureau naturally is not equipped or organized especially to render that kind of service for the department generally. It has work to do with its machines, and I should say it embarrasses them by discommoding their work and disrupting their arrangements for use of their force otherwise when we must call upon them constantly to detail machines for general department purposes.

Another instance: We have coming into Washington from time to time the winners in the boys' and girls' club work from the various States. They were sent here by their States, a trip to Washington being one of the rewards for their outstanding achievements along agricultural lines.

The department officers concerned take them to points of interest in the department, to the farms, etc., and other activities or work of

the department which they should see, and an automobiles is necessary to do this properly and at a minimum expenditure of time. Another instance: We need to take some pictures. Our men go out as far as Frederick or Mount Airy, Md., to take pictures of dairy farms and live stock. There are no machines to carry photographers or to carry the director of the picture or anything else, except as we borrow them from the Roads Bureau. The department is without passenger-carrying machines except for these road machines taken over second hand from the War Department. The only other passenger-carrying machine in the department at Washington is the car used by the Secretary. We have been handicapped so much in this respect that the department is asking the authority to use several of these machines continuously for general purposes of an official nature, and since it does not require any appropriation at all, we are hopeful that the request will be granted. The machines are owned by the Government and are available, and for that reason it seems unbusinesslike not to make the best use of them which the public interest indicates.

Mr. BUCHANAN. You mean they are there but not in running order?

Mr. JUMP. They are there and some are in running order. They are constantly conditioning these machines and sending them out to the road districts.

Mr. BUCHANAN. Do you want to purchase new machines by exchanging the old ones?

Mr. JUMP. No, sir; not for this purpose. That first proviso has nothing to do with the second one, which relates to Washington alone. The first proviso, which relates to the field service, Mr. McDonald will explain when he is here.

Mr. BUCHANAN. You are talking about the last proviso?

Mr. JUMP. Yes, sir. That was put in entirely without regard to the other proviso, and it does not contemplate the purchase of any machines whatsoever. All we want to do is to use for the department service the second-hand machines which we already have.

Mr. ANDERSON. I understand it does not contemplate the purchase of any machines, but is it six of one and half a dozen of the other. If the Bureau of Roads has to purchase machines for the ones which you take from it in the District of Columbia—and that is what you propose to do in the other proviso—I can not see any use of putting in this language. You might as well purchase new machines for taking distinguished foreign visitors about and allow the second-hand ones to be run around in the mud in the process of road making.

Mr. JUMP. Taking distinguished foreign visitors around is one of the smallest parts of our necessity. I merely mentioned that as an instance. The machines are more needed in the regular work of the department—getting the department people around without waste of time to the Budget Bureau, to the Government Printing Office, to the experimental farms at Arlington, Bethesda, Beltsville, etc., down to Alexandria, where we have four or five units, and so on. These are the real reasons why the cars are needed, and not, I may say, primarily for taking foreign visitors around; that is purely incidental.

Mr. BUCHANAN. The Secretary takes these machines which were turned over to him by the War Department for the purpose of distribution among the States in connection with road building. This proviso authorizes him to take some of those machines and use them here in the District of Columbia for Agricultural Department purposes. It seems to me like that provision is in direct conflict with the statutory law and absolutely new legislation, is it not?

Mr. JUMP. It might be so construed. But it is strictly in the public interest and required for the most efficient administration of the department. Some of these machines are in use in Washington already, because the Bureau of Roads has one of its headquarters here for one of its districts. The fact of the matter is that we are constantly having to borrow these machines temporarily for these purposes anyhow, and what we would like to do is to make the use of them entirely regular and under the central control of the department.

Mr. BUCHANAN. You are asking for these machines without number, without limitation of any character. Have you any idea how many you need?

Mr. JUMP. We would say, offhand, from three to six, and we could make the limitation accordingly if the committee desires. We just want a small number, and what we propose to do is to put them in the central garage of the department. All our motor trucks, which formerly were scattered about, are now pooled under the mechanical superintendent of the department, who comes directly under the Secretary's office, and that arrangement has effected a tremendous saving and put the trucking service on an efficient basis. It will not be our purpose to assign these cars anywhere. They will be under the office of the Secretary and each request for transportation will be closely scrutinized by the man in charge before he attempts to take care of it.

STATEMENT OF MR. C. W. PUGSLEY, ASSISTANT SECRETARY OF AGRICULTURE.

REORGANIZATION OF OFFICES UNDER OFFICE OF THE SECRETARY.

Mr. PUGSLEY. Mr. Chairman, I would like to read just one paragraph from the statement of the Secretary on the economies effected in the department during the past year, made a part of the record a moment ago:

The economies listed above are typical of the spirit in which the department people have entered into the plan to conduct the business of the Government on the most economical and efficient basis possible. While, as pointed out in the foregoing, we have been able to make a great many very substantial savings in money expended through the application of modern business methods it is increasingly evident that the largest economies to be effected in the department are those which are a result of efficient organization.

Such economies can not be expressed in dollars and cents. They are measured rather by the larger effectiveness of the work and the amount of work done for the money expended. The reorganization which resulted in bringing three units into one in the Bureau of Agricultural Economics is a case in point. This reorganization effected considerable savings which can be measured in money, but altogether the larger savings have come through the increased efficiency and better administration of the work done in this particular

field. I am quite sure that similar desired results will follow the reorganization of the extension work.

This reorganization has had the careful study of the Assistant Secretary for a year past and the final plan submitted is the result of that study. When put into effect, as we hope it may be, it will result in considerable saving of money, but, what is far more important, will greatly increase the effectiveness of the extension workers and the quality of the extension work.

CONSOLIDATION OF ADDRESSING AND DUPLICATING WORK.

On the subject of economies which have been made by giving attention to reorganization during the past year, the Secretary points out in this report that in the combination and consolidation of the addressing and duplicating work there was released \$20,000 worth of machinery to the General Supply Committee for assignment to other departments, and, in addition, the force of people employed to operate those machines was considerably reduced. Furthermore, the centralization of duplicating gives a check on the multigraph and mimeograph work of the department which can not be obtained unless it is centralized.

CONSOLIDATION OF STATISTICAL BUREAUS.

He also points out that in the consolidation of the Bureau of Markets, Bureau of Crop Estimates, and the Office of Farm Management there was a saving of \$30,000 merely in the overhead in the operation of what were formerly three bureaus.

REORGANIZATION OF STATES RELATIONS SERVICE AND DIVISION OF PUBLICATIONS.

By consolidating two extension offices in the States Relation Service into one office for the purpose of administering the Smith-Lever and other cooperative extension funds, there was a saving of approximately \$20,000 in the overhead.

CONSOLIDATION OF EXTENSION WORK.

As a matter of interest, I thought you might like to be informed concerning the type of organization that existed in the offices of extension in the States Relation Service before the consolidation was made. This chart represents the organization of the office of extension work in the South [indicating], where 15 States were administered, and this [indicating] the office of extension work in the North and West, where the rest of the States of the Union were administered. You will note that there are quite a large number of subdivisions in each one. Confusion was brought about by that sort of an organization. It was impossible to get a united and correlated extension program. Under the new plan there are but two divisions, aside from the clerical division, with but two heads, who act as counsel with the chief of the extension office. That is where we saved overhead and at the same time increased efficiency.

In addition, you have a logical type of administration of the cooperative extension work of the department, where it is considered from the standpoint of the two problems of administration. Under the division of programs what is to be taught is considered; under the division of methods how it is to be taught is considered. And, after all, those are the only two things that you have to deal with—

the "what" and the "how." It is absolutely essential that we have a united extension program with the home and the rural community as the object of the agricultural extension teaching. While the details of the work differs in the local communities, the Federal office must inject national and world aspects of the problem.

Mr. ANDERSON. Those statements indicate, apparently, that you no longer have the country divided up into districts, with district leaders; is that correct?

Assistant Secretary PUGSLEY. That is correct. We do not have separate offices administering the work by districts.

Mr. ANDERSON. You will go into that later, I take it?

Assistant Secretary PUGSLEY. Yes, sir.

Now I want to let the point of my remarks run to the proposed reorganization of the entire extension work of the department. The Secretary asked me to make a special study of the extension and publication activities of the department, and as a result of that study this is what I found [presenting chart to the subcommittee]. Practically every bureau in the department is authorized by the laws of Congress to do research work, many of them to do regulatory work, and a considerable number of them to do extension work.

To carry out and coordinate the research work and the regulatory work you will recall that Congress two years ago authorized the appointment of a director of scientific work and a director of regulatory work. There are, however, three lines of work in the Department of Agriculture. To my mind, all the work that is authorized in the department falls logically into one of three classes: Research, regulatory, or extension; but up to the present time there has been no director of extension work, outside of the secretary himself, who is correlating the extension work of the department. That is very clear in the chart which you have before you.

You will note that the States Relations Service has the office of cooperative extension work. In that office is lodged the administration of those funds which are spent in the States for cooperative work with the agricultural colleges. But there is also in the States Relations Service an office of experiment stations, which deals entirely with research problems, for it administers the Hatch and Adams funds for State experiment stations. There is likewise an office of home economic work doing, in effect, the same sort of work that a bureau does—research work and extension work. So you can see by the chart that bureaus that had experimental work that was done in cooperation with the States had to go through an office in the States Relation Service before it went to the director of scientific work, even after the establishment of that director. The logical place for the office of experiment stations is in the office of the director of scientific work.

In the Division of Publications we have the editing and printing of bulletins, the release of press material, and the duplicating and mimeographing, which is closely related to printing. But there are also two extension offices—the office of motion pictures and the office of exhibits—both offices for visual extension work. When a bureau wants to put out a motion picture or an exhibit it goes through the Division of Publications. If it is to be used in cooperative extension work, as 90 per cent of the pictures are, it must go through

the States Relations Service also. The chart also shows a director of information, who gives special attention to publications. Before publications reach the Secretary's office they go through the originating offices of a bureau, through the bureau chief, through the editorial office, and through to the Chief of the Division of Publications, then to the chief of information, and finally to the Secretary.

The proposed reorganization of the extension work is shown on this chart [exhibits another chart]. It calls for the transfer of some of the other work, other than extension, as you see. The Secretary is asking for the creation of a director of extension work, and proposes to place under that director of extension work those offices in the department which are extension offices, namely, the office of the cooperative extension work, now in the States Relations Service, and the offices of exhibits and motion pictures, now in the Division of Publications. In addition, he expects to charge that director of extension with the correlation of all the extension work of all of the various bureaus, asking the bureau chiefs to report through the director of the extension to him on all matters of extension work.

Mr. ANDERSON. Do you expect to continue extension work under the bureau as well as under this director of extension?

Assistant Secretary PUGSLEY. Some bureaus are charged with certain extension work, as you will note as you go through the appropriations. In addition, most extension work is of a more or less technical nature and must have technical direction. But those lines of extension work will clear through the director of extension, so that they will be correlated, and so there will not be duplication in the bureaus. At the present time there is nobody outside of the Secretary's office who can do that sort of thing. In other words, these three extension offices of the department are, in effect, the avenues through which the extension work of the bureau is cleared. We really have no things to extend except those things which originate in the scientific bureaus of the department.

The reorganization proposes to put under the director of scientific work the Office of the Experimental Stations.

The publications of the department may appear at first glance to be extension. They do furnish an avenue through which the department can get its information to the public, but publications are of three different types. There are those publications which are highly technical and which are published for the information of other research workers. The director of scientific work and the research people of the department are therefore tremendously interested in that type of publication, and in a sense that type of publication is not entirely extension.

Likewise, there must be published a large number of regulatory announcements. They do not need to go to the public in general; they only need to go to the regulatory offices out in the States. Those are not extension, in the general sense of the word, and they should clear through the office of the director of regulatory work.

The farmers' bulletins and popular publications should clear through the office of the director of extension work. But since this editorial work affects the three lines of work in the department—scientific, extension, and regulatory—it has seemed best to place the office of editorial work in the Secretary's office, where we will have

direct contact with it and where he will pass on all work finally, probably through the Assistant Secretary.

Mr. ANDERSON. If appropriated for separately now, I do not see anything to prevent you putting it anywhere you please.

Assistant Secretary PUGSLEY. The appropriation bill provides that the appropriation for the work in question is a part of the work of some bureau. We are asking that the wording of this year's bill will make the appropriations run in the direction in which we think they ought to run for the most efficient organization of the department.

BUREAU OF HOME ECONOMICS.

The Secretary, I think, is tremendously interested in another change. The office of home economics, under the States Relations Service, is to all intents and purposes a subject-matter bureau in the same sense of the other bureaus in the department. He believes that the time has come when this office should be made a bureau in fact; and it is his intention, if Congress approves of the proposal to make it a bureau, to place it in charge of a woman of scientific training.

Mr. MAGEE. What do we know about all this theory and red tape?

Mr. ANDERSON. He is telling you something about it.

Mr. MAGEE. He says he puts it up to us for determination. It seems to me you have enough horse sense to be able to put before the committee the facts, and then we might be able to reach some reasonable conclusion.

Assistant Secretary PUGSLEY. That is what we are trying to do.

Mr. MAGEE. There is so much long-drawn-out postulations and red tape that sometimes I think it is almost impossible for men in Congress to do any business, as it takes about half of the forenoon to attend to one little job now.

Assistant Secretary PUGSLEY. I fully sympathize with you.

Mr. BUCHANAN. When was this department reorganized? Was it not organized a few years ago?

Assistant Secretary PUGSLEY. What department?

Mr. BUCHANAN. All this publication department, bureau of distribution or publication, whatever you want to call it.

Assistant Secretary PUGSLEY. The Division of Publications has, so far as I know, never been fixed in its organization by the appropriations which have been made—

Mr. BUCHANAN (interposing). Was reorganized in the department

Assistant Secretary PUGSLEY (continuing). In all of its details The Division of Publications has been created by the appropriations, but certain things have been added to and taken from, as Mr. Anderson suggested a moment ago, by various Secretaries when they came in.

Mr. BUCHANAN. My question was, Was not the Bureau of Publications and publicity work of the department reorganized or, at least, combined just a few years ago?

Mr. JUMP. About two years ago there were several lines of work transferred into the Division of Publications. They included the press service, motion picture, and exhibits work.

Mr. MAGEE. The way it strikes me—I do not pretend to know about it—is that if we had some practical proposition upon which we could stand for at least a reasonable length of time without all these changes and reorganizations, and working out of hair-splitting theories all the while, we might accomplish something.

Assistant Secretary PUGSLEY. That is just exactly what we are trying to do, and that is the reason we think this chart exhibits that fundametal basis. I do not think you have ever had presented to you before—

Mr. MAGEE (interposing). I am only giving you my notion about it. If we could get some ground and build up on that ground in some logical way, so that instead of being presented a new-fangled notion every little while, we could reach some point where constructive work was possible.

Assistant Secretary PUGSLEY. This is just the reason we are presenting this plan of fundamental organization.

Mr. BUCHANAN. Will not this split up the publicity work, or advertising work, instead of consolidating it? You take the editorial work and the publication work out of this new organization you have got.

Assistant Secretary PUGSLEY. You put in the Secretary's office all of the printed work of the department, where it can be given special supervision; you put under the director of extension all of those extension activities by means of cooperative extension agents as well as by exhibits and by motion pictures.

Mr. ANDERSON. Is not this what you really do? You propose to bring the extension activities under the director of extension work, just as you have research under the research director and the regulatory work under the director of regulatory work?

Assistant Secretary PUGSLEY. Yes, sir.

Mr. ANDERSON. Then you propose to put this extension work, together with the activities allied with it, like publications, under the Assistant Secretary, or substantially so—I suppose that means under the Secretary—so as to get a correlation there?

Assistant Secretary PUGSLEY. Yes, sir. But no work in the Division of Publications, except the editorial, printing, and distribution work, goes into the Secretary's office proper.

Mr. ANDERSON. Is there anything else there?

Assistant Secretary PUGSLEY. Yes; motion pictures and exhibits.

Mr. JUMP. They do not really belong in publications now.

Assistant Secretary PUGSLEY. Do not logically belong there.

Mr. BUCHANAN. Why do you not do it? This is administrative business that it is proper for you to do, as I look at it. We did not organize this thing the way you have it now by act of Congress.

Mr. JUMP. Yes; Mr. Buchanan. The way the bill reads now, the Division of Publications has in it these two activities—motion pictures and exhibits, which are not really publication work. Administratively, the Secretary can run them any way he wants to, but it involves all kinds of complications in connection with bookkeeping and the accounting work, and the purchase of supplies, and all that; so that what he would like to do is, as Mr. Pugsley has explained, to do away with this confusion and actually bring these organizations that do not now belong in publications out of it, and to attach

them to the unit to which they really do belong—leaving the Publication Division to handle purely the publication work.

Mr. BUCHANAN. I thought we authorized the Secretary of Agriculture to carry on these activities generally by act of Congress, and that the manner in which he organized them and carried them on is an administrative function, purely and simply.

Mr. ANDERSON. Of course, that is true, Mr. Buchanan, but what they are trying to do here, as I understand it, is to get these appropriations arranged in such a way as to facilitate the organization of the department, which the Secretary thinks is the most efficient.

Assistant Secretary PUGSLEY. Is it not true that if you make an appropriation for motion pictures attached to the Division of Publication, that in effect places the motion-picture office in the Division of Publications?

Mr. ANDERSON. I think so.

Assistant Secretary PUGSLEY. What we are asking is that that appropriation read to the extension service and that a director of extension be created, so that we will have those things all together. We are asking merely for the changes in the language of the bill which will make that possible. It does not cost any extra money. We believe it will save money.

Mr. MAGEE. Without submitting things to our approval which we do not know anything about—at least, I do not feel I do—why not make reasonable appropriations you need and let you run this business in your own way?

Assistant Secretary PUGSLEY. Of course, we would be perfectly willing to do that.

Mr. BUCHANAN. In this reorganization do you contemplate changes of men of different positions, and so on?

Assistant Secretary PUGSLEY. Just what do you mean by that?

Mr. BUCHANAN. Do you contemplate putting some new men in there who are not now in there?

Assistant Secretary PUGSLEY. Yes, sir; we contemplate securing a director of extension work.

Mr. BUCHANAN. Is that the only new person you contemplate securing?

Assistant Secretary PUGSLEY. On the extension end of the work, it is. The Secretary is also asking for an editor in chief, at a salary which will permit him to get some person competent to do a lot of things that ought to be done in connection with the department bulletins.

Mr. BUCHANAN. Are those two men the only two men outside of the service you contemplate employing?

Assistant Secretary PUGSLEY. Those are the only two new positions we are asking for.

Mr. JUMP. And the amount of money required for these two statutory positions, namely, the director of extension and the assistant in charge of the office of editorial work, is specifically offset by reductions which are made in the related appropriations, so that there is no total increase whatever in appropriations connected with this proposed reorganization.

Mr. BUCHANAN. You speak of "related appropriations." Do you mean appropriations under the division of publications?

Mr. JUMP. As it is now, under the Division the Publications and the States Relations Service.

Mr. ANDERSON. You are creating a director of extension work, and you are putting under that director of extension work the work which you are doing now, with the exception of that which has been done heretofore under the various bureaus?

Assistant Secretary PUGSLEY. Yes, sir.

Mr. ANDERSON. Then, you will bring into that Bureau of Publications the office of exhibits and the office of motion pictures?

Assistant Secretary PUGSLEY. Yes, sir.

Mr. ANDERSON. You are taking out of the States Relations Service, that is, the extension end of it, the office of experiment stations?

Assistant Secretary PUGSLEY. Yes, sir.

Mr. ANDERSON. You are changing the name of the office of publications to the office of editorial and distribution work?

Assistant Secretary PUGSLEY. Yes, sir.

Mr. ANDERSON. And that covers the whole thing, does it?

Assistant Secretary PUGSLEY. Yes, sir; it does, except the Bureau of Home Economics.

Mr. ANDERSON. And you take out of the extension service the Bureau of Home Economics and make a separate bureau of that.

Assistant Secretary PUGSLEY. Yes, sir; and when that is done we do away with the Division of Publications and the States Relations Service, as such.

Mr. ANDERSON. All you do in this bill is to make such transfers of the appropriations as will accomplish these transfers of functions?

Assistant Secretary PUGSLEY. That is exactly it. No increases in appropriations are asked and no new lines of work established.

Mr. BUCHANAN. You have no increases in salaries? What are those? Just let the record show that.

Assistant Secretary PUGSLEY. If there are any increases, those will be taken up under the items as you come to them. There are no increases in salaries due to the reorganization, other than already explained.

Mr. BUCHANAN. You have the chief in charge, at \$5,000?

Assistant Secretary PUGSLEY. That is the editorial position I spoke of a moment ago, the man that the Secretary wants to take charge of all the publications of the department.

Mr. BUCHANAN. That is one increase, is it not?

Assistant Secretary PUGSLEY. That is a new position by transfer from a lump fund of the extension service, which fund has been reduced accordingly.

Mr. BUCHANAN. Then there are positions at \$3,500, an increase of \$500, is there not?

Assistant Secretary PUGSLEY. No, sir.

Mr. JUMP. That is a position which is now carried as the Chief of Division of Publications, and if there is to be no more Division of Publications, by that exact name, the title of the position should be changed accordingly.

Assistant Secretary PUGSLEY. There are only two new positions asked for: One is for a man to take charge of this editorial work in

the Secretary's office and the other is the director of extension work. There is no increase in money asked for.

Mr. BUCHANAN. What is his salary?

Assistant Secretary PUGSLEY. \$5,000 for the director of extension, the same as the other directors—the director of scientific work and the director of regulatory work.

Mr. BUCHANAN. That is, the other directors provided for last year by Congress come under that bill, allowing the Secretary to employ so many at not to exceed \$5,500?

Assistant Secretary PUGSLEY. No, sir. That was another matter and did not refer to directors, but to salary increases on lump funds.

Mr. MAGEE. So you wanted a lot of changes, and I think that the committee acquiesced in them. It seemed to me, then, as if we were getting down to some fundamental foundation on which we could build. Now, you come along again this year and you want to change all that.

Assistant Secretary PUGSLEY. No, no; we want to change none of that at all. I think we are on the foundation with that. This is something which was not taken up then, and has not been taken up with you before.

Mr. MAGEE. You have new ideas as to the director of regulatory work, a director of extension work, a director of scientific work, etc. Now, you will probably come along another year—you may not be here, and somebody else wants something different; and so we will keep on changing and shifting and transferring. It seems to me matters of appropriation ought to be simplified rather than being made more complex all the time, and that instead of having a volume representing agricultural appropriations of 300 or 400 pages, it could be greatly simplified and reduced in size.

Mr. BUCHANAN. I have no objection to any system that will improve the service, and I am inclined to aid any system that will make that improvement. In this reorganization, do you contemplate the dismissal of any employees now in there or demotion of any employees now there?

GRADUAL ADOPTION OF PLAN OF REORGANIZATION.

Mr. JUMP. As I understand the details of this plan, Mr. Buchanan, they do not contemplate making any great cut, because we have got to go step by step. But we are doing this, and I think this will appeal to the committee and to the Congress as an added reason for making this change. Here, under the Secretary's office, when we place these other units in operation we will have six or seven different branches of the service. We propose to do something at the beginning of the fiscal year that has not been done enough in the Government service, and that is place the overhead work for all these branches in one centralized accounting office under the immediate supervision of the Secretary. It will do the counting and purchasing and all that sort of thing for all these branches. In that consolidation of overhead, if past experience is to be our guide, it seems quite likely that there will be some reduction in the force.

For instance, every time we have consolidated we have found, after we got running, as we did in the addressing and duplicating that the Assistant Secretary mentioned, and economic work, some employees could be dispensed with; and undoubtedly the Secretary

will order that to be done. He is not going to keep on the rolls one single employee more than is necessary, in so far as we can determine. He really expects to economize.

Mr. BUCHANAN. What I was driving at is, they are putting two new men in. Then it looks like you were putting on new men and dismissing old employees. I would like to inquire whether it is specially contemplated to drop some special ones and put on other special ones?

Assistant Secretary PUGSLEY. Mr. Buchanan, we are dropping employees wherever we find that they are not rendering service and where we find we can get along without them.

Mr. BUCHANAN. That is correct; that ought to be done.

CENTRALIZATION OF ACCOUNTING WORK.

Assistant Secretary PUGSLEY. And this reorganization, I think, will permit us to do some more of that. Mr. Jump spoke about the accounting work. I have before me a chart which was prepared by a special committee appointed to look into the accounting work under the proposed organization, and instead of having several accounting offices, if Congress approves the reorganization plan which I have just submitted, we expect to have one accounting office for all the following work: The office of director of scientific work, the office of director of extension, the office of director or regulatory work—the editorial and distribution work—the office of the solicitor, the office of the chief clerk, the offices of inspection, personnel, mechanical shops, and traffic manager; all of which are under the Secretary now, you see, many of which have separate accounting offices at the present time.

Mr. BUCHANAN. The only reason I asked that question is that you remember when this item was up last year I was told by four or five Members of Congress that the department contemplated dismissing a certain man, and I asked the director a question—I do not remember his name now—

Assistant Secretary PUGSLEY. And we told you we did not; and I can say this, we do not have in mind a dismissal of any individual. What we do have in mind is letting go such people as can be let go by the savings that will be effected by any reorganization.

Mr. BUCHANAN. That is entirely proper. The only reason I asked the question was calling to mind other Members of Congress coming to me about this man. I can not keep those names in mind. I did not know him. I just wanted to inquire about that. Congress is not in session and my other colleagues are not here.

Assistant Secretary PUGSLEY. You can assure any of them that we do not have in mind any individual to be dropped.

Mr. BUCHANAN. No man is more in favor of economizing and cutting out all the employees you can and at the same time maintain the efficiency of the service than I am.

Mr. MAGEE. How does the number of employees compare with a year ago?

Assistant Secretary PUGSLEY. That I can not answer. I know they have been cut down in certain parts, and probably added to in others because of increased appropriations made last year.

Mr. JUMP. We had some new lines of work—the Center Market; the fixed-nitrogen research laboratory, transferred from the War Department; and the administration of the packers and stockyards and the grain futures acts.

Mr. MAGEE. Can you give us a statement on that?

Mr. JUMP. In detail?

Mr. MAGEE. In the aggregate.

Mr. JUMP. I can tell you, offhand, there was a slight increase in the total of the department of several hundred employees during the last fiscal year, due principally, of course, to additional responsibilities placed upon the department, such as those I mentioned a moment ago.

Mr. MAGEE. You are talking about a decrease, and I was interested in knowing to what extent the force had been decreased.

Assistant Secretary PUGSLEY. The statement of the Secretary relating to economies in the department, which was not read but which was made a part of the record, will cover a considerable part of that.

OFFICES OF EDITORIAL AND DISTRIBUTION WORK.

STATEMENT OF MR. JOHN L. COBBS, CHIEF, DIVISION OF PUBLICATIONS.

REASONS FOR CHANGE OF TITLE.

Mr. ANDERSON. Who is going to present this phase of the editorial and distribution work? First, Mr. Pugsley, if you will, I would like to ask one or two things about this reorganization before we start in on the details of the statutory roll. Among the other changes that provides is a change in the name of the Division of Publications to offices of editorial and distribution work. Now, in the last appropriation bill a question arose as to whether a change in name of that sort was legislation. My recollection is that the Chair held that it was. If it was, this change can not be made in the appropriation bill without legislative authority. In view of that fact, I would like to ask you what importance, in your mind, attaches to this change of name?

Assistant Secretary PUGSLEY. The change in name from division to offices would be in accordance with the general plan that is now being considered within the department of nomenclature in connection with the names of the various bureaus and divisions and offices. It would more clearly represent in the minds of the people in the department the exact place that they would occupy in the general scheme of organization and would be very helpful psychologically.

Mr. ANDERSON. Are there any further questions?

Mr. BUCHANAN. I have none.

Mr. ANDERSON. Are there any other changes of names, except in the case of the Bureau of Economics, involved in this reorganization?

Assistant Secretary PUGSLEY. That change was made last year.

Mr. ANDERSON. Yes; but I mean the Bureau of Home Economics.

Assistant Secretary PUGSLEY. No; that is all. We merely ask the change of name from office to bureau.

Mr. ANDERSON. Then you change the title of the extension service?

Assistant Secretary PUGSLEY. The term "extension service" is used to indicate the correlation of those offices that are devoted to extension work.

Mr. ANDERSON. Instead of States Relations?

Assistant Secretary PUGSLEY. States Relations is dropped.

SALARIES.

Mr. ANDERSON. We will take up the statutory roll, on page 11. I think we will perhaps save time, in view of the fact that this all appears to be new, if you would indicate just what places or salaries in the roll are new or represent transfers from other bureaus.

Mr. COBBS. As Mr. Pugsley has told you, the present division is to be abolished and the work it now includes is to be put partly into the new office of extension and partly into the new offices of editing and distribution. Those places now on the division roll which are assigned to the offices of motion pictures and exhibits have been transferred to the extension office roll. The roll as presented on page 11 for the editorial and distribution work consequently shows only those places actually occupied by people in editorial and distribution work, the press service, and the illustrations and duplication sections.

TRANSFERS FROM OTHER DIVISION AND LUMP-SUM ROLLS.

Mr. ANDERSON. This roll, then, does not contain any new places or changes of salary?

Mr. COBBS. It contains only transfers from the rolls of other bureaus. I will indicate those as I come to them.

The first place, page 11, assistant in charge of editorial office, at \$5,000, is a transfer from a lump-sum fund of the extension service, which has been correspondingly reduced, and is to provide for a person to take charge of the offices of the editorial and distribution work. The second place, assistant in charge of office of distribution, is a new title, being changed from the position of Chief of the Division of Publications. The third place, editor, is a change of title from chief editor of the Division of Publications. That is the place at \$3,000. The executive assistant is a new place in lieu of the position now on the statutory roll in the Division of Publications, assistant in charge of information. The next place, assistant editor, at \$2,250, is transferred from the statutory roll of the Bureau of Animal Industry, with a change of title from editor and compiler.

Mr. BUCHANAN. That is the assistant editor?

Mr. COBBS. Assistant editor; yes.

Mr. BUCHANAN. That is the first one?

Mr. COBBS. The first one, at \$2,250.

Mr. BUCHANAN. He comes from where?

Mr. COBBS. The Bureau of Animal Industry. Now, under assistants in charge—

Mr. BUCHANAN. These two at \$2,000 and one at \$1,800, what are they?

Mr. COBBS. They are positions now on the statutory roll of the division. Under assistants in charge we drop the assistant in charge of distribution, at \$2,500—perhaps I should say that the title is

changed from assistant in charge of distribution to assistant. You will see below that we have two assistants at \$2,500, instead of one, as we have at the present time.

Mr. BUCHANAN. Let me get that straight. Is this another new position at \$2,500 that you have just mentioned?

Mr. COBBS. No; just a change in title from assistant in charge of distribution, which is the present title, at \$2,500, to assistant, at \$2,500.

Mr. BUCHANAN. That is just one of them.

Mr. COBBS. And we have one already, which will make two for the next year. If I may go back just a second. Under assistant editors, at \$1,800, we have at the present time two, one of whom is attached to the office of motion pictures, and that position is accordingly transferred to the extension office, leaving one in the division.

The next change comes in draftsmen and photographers, at \$1,600. At the present time the division has three places. Two of these are employed in the motion-picture office, and have consequently been transferred to the office of extension. Likewise, there is at the present time draftsman or photographer, at \$1,500, in the motion-picture office who has been also transferred. Other transfers include an assistant photographer, at \$960, and a laboratory aid, at \$900.

In the clerks, we have now 5 of class 4; two of them are assigned to the office of exhibits and have been transferred. Three clerks of class 2, assigned to the office of exhibits, and 1 of class 2, assigned to the office of motion pictures have been transferred, reducing the number of positions of that class in the division to 10. Two clerks of class 1 in exhibits and 1 of the same grade in motion pictures have been transferred to the office of extension, reducing our total to 18. One clerk at \$1,100 in the office of exhibits, and two clerks at \$960 in the office of motion pictures have been transferred, with change in title to laboratory aid.

The next change there occurs, I think, in the \$840 messenger or laborer grade, in which one position in the office of motion pictures is transferred to extension; in the \$720 grade one is transferred. A messenger boy at \$720 and one at \$600, attached to the office of motion pictures, are transferred to the statutory roll of the extension office, and this roll has been reduced accordingly.

The assistant in charge of motion pictures and the chief cinematographer have been transferred to the statutory roll of the office of extension work; the assistant in charge of exhibits and the assistant in exhibits, with salaries of \$3,000 and \$2,000, respectively, have been transferred to the lump-sum fund of the exhibits appropriations.

POSITIONS ELIMINATED.

Now, let me come down to the \$960 clerical grade. Five of these positions have been dropped in addition to those which have been transferred from the roll; in addition, 1 messenger or laborer at \$840, 1 messenger boy at \$720, 1 messenger or laborer at \$720, 2 messengers or laborers at \$600, 1 messenger boy at \$480, and 1 charwoman at \$240 have been dropped. Those positions have been dropped in accordance with the secretary's desire to decrease the personnel.

Mr. BUCHANAN. Now, are those positions dropped out of this organization as it now exists, under the present appropriation?

Mr. COBBS. You mean for the present fiscal year?

Mr. BUCHANAN. Yes.

Mr. COBBS. The totals in the estimate for next year have been decreased.

Mr. BUCHANAN. Are they working now or not. That is what I want to know.

Mr. COBBS. Part of those positions are filled at the present time.

Mr. BUCHANAN. What proportion of them are filled, and what proportion of them are dropped?

Mr. COBBS. I can tell you which of those are filled: Messenger boy at \$720 and one at \$600 are occupied; the charwoman at \$240 is occupied, and one of the laborers' positions at \$840 is occupied. The positions at \$960 are vacant, but appointments which had been offered to eligibles have been accepted, so that all of the places which are to be dropped from the roll probably will be occupied shortly except one messenger or laborer at \$720. It is not expected that any clerk will have to be dismissed on July 1 as it is thought that there will be enough clerical vacancies caused by resignation during the remainder of the fiscal year to make up the five positions dropped. The charwoman, laborers, and messenger boys will have to be dropped at that time, unless they can be transferred or their positions have become vacant otherwise.

Mr. BUCHANAN. How many of them?

Mr. COBBS. There are five of those that have been dropped.

Mr. BUCHANAN. So that saving is already made under the present bill and the present plan—five positions at \$960.

Mr. COBBS. I would like to make this statement there. We have had a good deal of difficulty in filling some of these \$960 positions. In fact, the turnover in the \$960 grade during the past year was in excess of 40 per cent, and we have had a great deal of difficulty in getting competent people for our work at that salary, so that we have had a good many vacancies throughout the year which were in process of being filled, and two or three which we haven't filled, because we felt we could get along in a pinch without them.

Mr. BUCHANAN. If you had wanted to have had some of these five positions filled, you could have had them filled?

Mr. COBBS. Yes; we could eventually have filled them.

Mr. BUCHANAN. When you say they were dropped, you don't mean you discharged anybody; they just quit. Is that it?

Mr. COBBS. Yes. The positions are now vacant or are expected to be vacant as a result of turnover in the division.

Assistant Secretary PUGSLEY. And, I think you might add, the inability to get people to do the work that these positions called for at that salary. Therefore, it was thought better not to try to fill the positions.

Mr. COBBS. It has taken during the past year anywhere from three to five weeks to fill those positions satisfactorily. We have had to do a tremendous amount of correspondence with people all over the country.

Mr. ANDERSON. Are those people machine operators?

Mr. COBBS. No. These are clerical positions I am speaking about.

Mr. ANDERSON. The net result of this business is that you transferred into this item \$8,930, you dropped places amounting to \$9,000, and you transferred out of it to other bureaus \$36,160?

Mr. COBBS. Yes, sir.

Mr. ANDERSON. Is there anything further on this item?

Mr. COBBS. One machine operator's place at \$1,200 has been added by transfer from the Federal Horticultural Board, and one messenger boy's place at \$480 from lump fund, extension service. I think that is all, so far as I am concerned.

GENERAL EXPENSES.

Mr. ANDERSON. Then, we will take up the item on page 13, "General expenses."

Mr. COBBS. General expenses. The language is changed from "Division of Publications" to "Offices of Editorial and Distribution Work," and the total amount of \$57,930 has been decreased by \$10,080, which represents that part of the appropriation that we used to know as the extra labor fund, which was due to the office of exhibits. This office has been transferred to the extension service and the exhibits appropriation for that service has been increased by that amount. That necessitated a change in the amount which is now available for extra labor and employment, \$11,380, to \$1,300.

Mr. ANDERSON. Do you still require all of that language?

Mr. COBBS. That was changed last year. So far as I am concerned, I would like to let it stay just about as it is. You see, last year we combined all the various small appropriations we had into this one large appropriation to give us greater leeway in handling it.

PRINTING AND BINDING.

Mr. BUCHANAN. If there are no questions on that item, we will take up the next item. That is all there is of that stuff, isn't it, except printing and binding?

Mr. COBBS. Shall we talk about that now?

Mr. ANDERSON. Yes.

Mr. COBBS. The language in the bill has been entirely changed in order to bring it into conformity with instructions of the Bureau of the Budget in regard to combining all printing expenditures of the department in one appropriation. That is to say, whereas we formerly had a lump appropriation which was allotted to the bureaus for printing and binding some of the bureaus which had funds available for the purpose also had what we know as "repay" work done at the Printing Office. You are probably familiar with that. The effect of this wording is to bring into one fund all of the moneys of the department which will be expended for printing. The amount has been reduced from \$800,000 for this year to \$700,000, and the language causes a further actual decrease, in that, whereas the "repay" work was formerly paid for from separate bureaus appropriations, it is now all covered by this item and the approximately \$39,000 or \$40,000 which that repay work amounted to last fiscal year is included in the \$700,000 total asked for here; so that from, we will say, the \$839,000 or \$840,000 which the department has available this year, the amount next year will be reduced to \$700,000.

Mr. ANDERSON. This practically does away, then, with all the "repay" work in the department?

Mr. COBBS. Yes. I think that is the plan.

Mr. JUMP. It is designed to do away with it altogether.

Mr. ANDERSON. That was my understanding. When we had the legislative bill up on that, my understanding was that when we had this bill completed the repay work was to be done away with altogether.

Mr. JUMP. I don't see how any repay work can be done next year. We had conferences at the Budget Bureau, and the language was designed to that end—to do away with it. It says for "all printing of the Department of Agriculture, including all of its bureaus, etc."

Mr. COBBS. The only thing it doesn't include is covered by the proviso, which covers the Weather Bureau, printing offices in the field, and the Forest Service office at Ogden.

Mr. JUMP. And it covers such printing to be done outside of Washington as may be authorized in emergencies. It runs around \$5,000 a year. That would have to be paid from this fund also.

REDUCTION OF ESTIMATE BY BUDGET BUREAU.

Mr. ANDERSON. May I ask how this estimate of \$700,000 has been arrived at? Was it in collaboration with the Printing Office or based entirely upon your own figure?

Mr. COBBS. It is based, so far as I know, upon our own figure. Mr. Jump can tell you about that.

Mr. JUMP. The department's original recommendation was for the same amount as this year, and this is one of the cuts which became necessary after the estimates were submitted to the Budget Bureau. The Department will merely accommodate itself to the cut and try to get along in the best manner possible with the reduced amount.

Mr. ANDERSON. Do you happen to know whether that cut was made by the budget officers in accordance with estimates submitted by the Government Printing Office, or was it a purely arbitrary proposition.

Mr. JUMP. I feel rather hesitant about saying as to that. I do not know that they consulted with the Government Printing Office, but in any event I would not say it was arbitrary, because that might cast a reflection on the Budget Bureau that is unwarranted and that I don't want to cast on them. My impression is that since cuts had to be made this was regarded as a good place to cut. In other words, a cut could be made here, in all probability, with less harm to the work than in some other places. It is one of the large lump funds, and the department's apparent turnback last year, I think, was a considerable factor. The department turned back a considerable fund, although the carryover to this year was very heavy, and they probably thought the printing business ought to be restricted. Of course, I am not authorized or qualified to speak for the Budget Bureau on these matters.

Mr. BUCHANAN. That virtually says that it was arbitrary, so that you might just as well have said it in so many words.

Mr. ANDERSON. Well, in arriving at these figures two years ago, I happened to be on the legislative committee which had the appro-

priations for the Government Printing Office, and my recollection is that at that time we arrived at the conclusions we reached as a result of representations by the Government printer that the cost of paper, the greater efficiency of the offices, and the general reduction of expenditures accomplished there made it possible to do the same amount of work for less money, but, on the other hand, if this means there is going to be less printing done, that is different.

Assistant Secretary PUGSLEY. I think it means there will have to be less printing done than there would be with a larger appropriation, because it is impossible to do as much printing, even with the reduced costs, as it would be with the \$800,000. On the other hand, we are constantly making combinations of periodicals and making improvements and changes in the work of the printing, and the Public Printer is doing the same thing, I think, so that the reduction in the amount of printing will be less, perhaps, than the reduction in the total.

Mr. ANDERSON. Well, my observation of investigational research work is that it is a whole lot easier to make an investigation and get the facts together than it is to get them out and get people to read them, and nothing is gained by a policy which involves spending an enormous amount of money to get facts, by research work, and then cuts at the other end, so that what you do is embalmed in the brains or in the library of the Department of Agriculture. So, as far as I am concerned, I would hesitate a good deal before cutting this appropriation below the limit of the useful work that can be done through the distribution of the publications.

Mr. COBBS. Mr. Anderson, suppose I give you just a few figures which will give you the actual status of the printing fund as to last year. We had a total of \$850,000. We returned to the Treasury unused, \$183,848.79. But we had a carry-over at the end of the year at the Government Printing Office of approximately \$141,000. That is to say, had we been able to get delivery of the work which was at the Printing Office we would have had an unused amount in our printing fund of approximately \$42,000.

Assistant Secretary PUGSLEY. That is, there was work turned in, but because of the rush at the Printing Office it could not be delivered until after July 1, and that will have to come from this appropriation. A good many manuscripts were submitted for printing against the deficiency appropriation. Mr. Marvin had a number of manuscripts he was very anxious to get out.

Mr. ANDERSON. The charge, then, I take it, is not made by the Government Printing Office against the Department of Agriculture until the work is delivered?

Mr. COBBS. The final charge is not made until delivery.

Mr. ANDERSON. So that while you may have had work in their office which would have absorbed that entire appropriation this year, or last year, you have one hundred and eighty thousand and odd dollars come back into the Treasury because the work was not delivered and paid for, and you have got to pay for that \$140,000 carry over this year out of this appropriation?

Mr. COBBS. That is the situation exactly, and some of the bureaus—I think Mr. Marvin particularly—had a number of expensive publications which were put in early last year and which were not delivered

until this year, so that the allotment this year is going to be materially reduced by this carry over.

Mr. ANDERSON. Are there any questions?

Mr. BUCHANAN. No.

Mr. ANDERSON. Does that finish you, Mr. Cobbs?

Mr. COBBS. Yes, sir; I think that finishes me.

Assistant Secretary PUGSLEY. There is a statement that Mr. Cobbs has of the work done last year. I wonder if you would like to have that in the record.

Mr. ANDERSON. Yes. Put it in.

Mr. COBBS. It brings out just a few of the salient features, and I would like to have it go in as an exhibit.

ACTIVITIES OF DIVISION OF PUBLICATIONS.

The Division of Publications as constituted at present is charged with the duty of editing, illustrating, printing, and distributing all publications of the department except periodicals. A large duplicating section is also maintained for the use of the various bureaus of the department.

All publications, with the exception of the periodicals, after being approved by the Assistant Secretary in charge of publication activities, are sent to this division for editing. Here they are read for correctness of fact, departmental policy, and proper diction and style. The necessity for such a careful and constructive editing is shown by a number of cases in which more or less serious discrepancies of fact as well as policy have been detected during the past year. Examination of this sort prevents the department from becoming involved in controversies or in issuing statements which can not be sustained. The illustrations are also examined to determine their suitability for the particular conditions they are supposed to show, and the photographs are prepared for reproduction. The manuscript is marked for the printer, attention being paid to the possibility of shortening or condensing it to the most economical form of printing consistent with the requirements of the publication. All contacts with the Government Printing Office in regard to printing and delivery of publications are made through this division.

WORK PERFORMED WITH GREATEST POSSIBLE ECONOMY.

An important activity is the scrutiny of all forms printed by the department in an effort to effect economy. A practical printer, who is an expert on stocks of paper, is employed, whose duty it is to determine whether the quality of paper called for by requisitions originating in the various bureaus is suitable for the purpose for which it is intended. This examination results in a considerable saving of the printing fund each year, as it is very often found possible to substitute for high-quality, expensive papers specified in requisitions other much less expensive paper equally well adapted for the intended use.

PUBLICATIONS RECEIVED AND DELIVERED.

When the publications are delivered by the Government Printing Office the difficult and important task of seeing that they get into the hands of those persons who need and can use them to the best advantage is carried on by the distribution section of the division. During the past fiscal year more than 43,000,000 copies of publications, including periodicals, were distributed. This represented an increase of about 36 per cent over the fiscal year 1921. Many of the publications were sent out to the names on mailing lists maintained by the various bureaus of the department, but a much larger number were distributed to individual applicants who wrote to the division for bulletins in which they were interested. The division likewise assisted Members of Congress in distributing more than 14,000,000 farmers' bulletins of the Congressional quotas. All told, 643,369 communications in regard to the publications of the department were received and handled during the fiscal year. These figures give some idea of the enormous volume of the work involved in the distribution of department publications. Indeed the distribution work is one of the most important methods of contact with the public which the department has.

MAILING LISTS.

One important part of the distribution work is the maintenance of the mailing lists of the department. As a result of the division's efforts in revising and bringing these lists up to date last year the number of stencils at the Government Printing Office was reduced by 95,406, and those maintained in the department by 20,000 names. The discontinuance in October, 1921, of one list to which all farmers' bulletins had been sent as issued resulted in saving 344,000 copies of farmers' bulletins, or at least in making that many more available to meet the demands made upon this division.

The section of illustrations, in addition to performing a considerable amount of photographic field and laboratory work for the various bureaus of the department, prepares the illustrations for department publications.

CONSOLIDATION OF ADDRESSING, DUPLICATING, AND MAILING WORK.

As was reported to the committee at the hearings on the agricultural appropriation bill last year, the addressing, duplicating, and mailing work of the department was consolidated in this division last winter. As a result of the consolidation, surplus material valued at more than \$20,000 was turned over to the General Supply Committee after provision had been made for the needs of this division as far ahead as could be foreseen. The duplicating section is equipped with up-to-date machinery and is prepared to perform duplicating work in large quantities on short notice. Material savings have been effected by the application of basic principles of shop management by which the output per man and per machine has been increased. Careful management has likewise resulted in cutting the paper wastage from approximately 4 per cent to about 1 per cent, while the quality of the work has been materially improved.

At the beginning of the fiscal year 1921 all the information and publicity activities of the department, including exhibits and the press service, were consolidated in the division. The motion-picture work had since its beginning been in the division. The proposed reorganization of the extension and publication work contemplates a different line-up. During the past year the office of exhibits and the press service have been detached from the division and placed, respectively, in the offices of the Assistant Secretary and Secretary. More recently the motion-picture work has been attached to the office of the Assistant Secretary. The proposed plan of reorganization as submitted in the estimates for the fiscal year 1924 provides for the complete elimination of the division. The offices of exhibits and motion pictures are included in the proposed extension service, and the press service is attached to the office of the Secretary. The other activities now conducted by the division are to be placed in offices of editorial and distribution work and attached to the office of the Secretary. The personnel formerly allotted to motion pictures and exhibits have been added to the proposed appropriation for the extension service and the estimates for the proposed offices of editorial and distribution work now includes only those places connected with this work and the clerical force of the press service.

A new position, at \$5,000, as assistant in charge of the editorial and distribution work by transfer from a lump fund of the extension service is requested to provide someone to take charge of these activities. The position of the chief of the Division of Publications is abolished, and there is submitted in lieu thereof a position as assistant in charge of the office of distribution at the same salary, \$3,500. The position of chief editor is changed to editor with no change in salary. These other changes in title are contemplated, as shown by the detailed estimates.

OFFICE OF EXPERIMENT STATIONS.

STATEMENT OF DR. E. W. ALLEN, CHIEF OFFICE OF EXPERIMENT STATIONS, AND DR. W. N. EVANS, CHIEF DIVISION OF INSULAR EXPERIMENT STATIONS, STATES RELATIONS SERVICE.

DUTIES.

Mr. ANDERSON. Doctor, this appears to be a new item; will you tell us about it?

Doctor ALLEN. The Office of Experiment Stations has been in existence in the Department of Agriculture for many years, represent-

ing the Secretary of Agriculture in his relations with the experiment stations and carrying out the provisions that the Secretary shall prescribe the form of the annual financial statement under the Hatch and Adams Acts, and shall ascertain that the expenditures are in accordance with the terms of the appropriation. We have made an annual inspection of the experiment stations in each State and published a report to Congress as is provided. We have also rendered various assistances to the experiment stations in the way of getting together the status of information on different subjects that they were investigating. We have been publishing the Experiment Station Record, which is a record of research work in agriculture in this country and abroad.

Now, when the States Relations Service was established the Office of Experiment Stations was brought into that States Relations Service as representing one branch of the department's State relations. We have had a fairly distinct personnel assigned to the Office of Experiment Stations, largely technical people selected because of their qualifications, and to assist them a small corps of clerks.

Mr. ANDERSON. Let me ask you, in order to get this right in my mind. I understand that this is the overhead for the supervisory force in charge of the allotments under the Hatch and Adams Acts appropriating \$720,000.

Doctor ALLEN. That is it; and also the funds which Congress gives to maintain experiment stations in the insular possessions.

Mr. ANDERSON. This has nothing to do with the funds under the Smith-Lever Act?

Doctor ALLEN. Nothing at all. It is entirely a matter of research, and therefore in the reorganization it is proposed to assign this office to the director of scientific work.

SALARIES.

In the appropriation asked for there are no increases and no decreases. There are transfers of three clerks, totaling \$4,400, which decreases the lump-sum appropriation and increases the statutory roll by a corresponding amount, raising the statutory roll from \$29,900 the current year to \$34,300 for the coming year.

GENERAL EXPENSES.

Mr. ANDERSON. All right. Any questions on that? If not, we will take up the matter on page 19, general expenses. This is the Hatch Act?

Doctor ALLEN. This is the Hatch and Adams Acts—the same for each State and Territory each year.

Mr. ANDERSON. The conditions under which this is made is provided by the act itself?

Doctor ALLEN. Yes. In complying with the terms of the law we have to—

Mr. ANDERSON (interposing). Just a minute. I notice you take out of this item here the words "and Territories." I assume that is due to the subsequent assignment of the appropriation to the insular possessions—Territories and insular possessions?

Doctor ALLEN. No, sir; when the Hatch Act was passed there were quite a number of Territories—Arizona and others. Those have all become States, so that this only provides for continental United States.

Mr. ANDERSON. So that that language is not applicable any more.

Doctor ALLEN. It is superfluous.

Mr. ANDERSON. And the same thing is true of the item on page 20?

Doctor ALLEN. Yes, sir; and that second limitation, providing that not more than \$15,000 should not be paid to each State and Territory, was deemed superfluous, because it is carried in the Adams Act itself.

AGRICULTURAL COLLEGE EXTENSION WORK, ETC.

Mr. ANDERSON. The next item is the one on page 21.

Doctor ALLEN. That provides for supervision by the Secretary of Agriculture of these funds under these two appropriations and the supervision also of the insular experiment stations.

Mr. ANDERSON. I see you have some language eliminated here. It apparently eliminates reference to the acts of May 8, 1914, and the act approved July 2, 1862.

Doctor ALLEN. That was the original Morrill Act. This May 8, 1914, is the Smith-Lever Act; that has been taken out and put under the extension office.

Mr. ANDERSON. Oh, I see. This is all one proposition and takes out of the operation of this particular appropriation the work under the Smith-Lever Act?

Doctor ALLEN. Yes, sir.

Mr. ANDERSON. I see. Evidently you are not spending much money under this appropriation for supervision of that act.

AGRICULTURAL EXPERIMENT STATIONS OUTSIDE CONTINENTAL UNITED STATES.

The next item is on page 23, “ * * * to establish agricultural stations in Alaska,” etc. There you make a reduction of \$5,000. If my recollection is correct, last year there was a proposition which involved the construction of some buildings in Alaska. Can you tell us what happened to that?

Doctor ALLEN. Doctor Evans will explain that.

ALASKA EXPERIMENT STATION.

Doctor EVANS. The situation, Mr. Chairman, so far as the buildings in Alaska are concerned, is practically the same as it was. We did not get the appropriation we asked for 1923. The only building work that has been done was some repair work at the Fairbanks Station to render the old log building habitable and to replace the root cellar at the Fairbanks Station, and one at the Sitka Station, both of which had fallen in, and it had become necessary to replace them to take care of the root crops and other things that had to be kept from freezing during the winter.

Mr. ANDERSON. Well, this item for Alaska, then, doesn't cover any new construction for this year?

Doctor EVANS. No, sir. The appropriation recommended for Alaska for 1924 is \$5,000 less than the amount has been for the previous four years.

Mr. ANDERSON. What was the idea of making \$11,800 immediately available?

Doctor EVANS. That was put in as a compromise figure between the \$15,000 asked for and the amount actually expended in developing a new station at Matanuska. The station at the latter place was established after the railroad had gotten along pretty well toward the interior, and it was asked that \$15,000 be made immediately available, and it was afterwards made \$11,800, which was practically the amount spent at Matanuska during the first year of construction and development work. That item has been in the appropriation bill for a number of years in order to take care of a situation which sometimes arises in Alaska, where the work would be very materially hampered if we didn't have available funds for the spring work, and although the funds have been allotted by quarters the greatest expenditures come in the first and fourth quarters. Conditions have arisen in emergencies where it has been quite necessary to have it immediately available. That matter has been taken out this year, although it was requested it be kept in. This last year there has been practically none of the immediately available portion spent because it was a very late spring and the field work did not begin until about a month later than usual.

Mr. ANDERSON. Your weather hasn't changed up there any, and since it hasn't I can't see any reason for taking this thing out, if it was a good thing in the beginning.

Doctor EVANS. Doctor Georgeson has always maintained that was a good thing, so that the work would not be retarded in the spring.

Mr. BUCHANAN. When does spring open up up there?

Doctor EVANS. It depends on the part of Alaska. Ordinarily in southern and southeastern Alaska about the 10th of May; in the interior about the 20th; but this year it was much later than usual—almost a month later than usual, and that was also true of a great deal of the northern part of the country. The spring was very late.

Mr. JUMP. I think I can clear up the reason why that was left out. When we got these estimates all together we discovered that for the first time in many years we had a set of estimates that did not require some money to be made immediately available. We thought it would be a good thing, in the interest of simplicity, to let this Alaska provision stay out. The same argument for having it left in could be applied to any number of lines of work in the department—the greater part of the work coming in the first and fourth quarters. That is true of a number of different projects.

As we understand it, this man will not have to use his money this year, and we thought if he could start anew one year, he would always have, presumably, in his fourth quarter money enough to do his work for that year, and we could thus avoid cluttering up the bookkeeping with this thing of having money immediately available every year. The department wants to avoid that as far as possible, and we have understood that to be the policy of Congress.

Mr. ANDERSON. I think it is very desirable.

Mr. JUMP. If a vital emergency should arise and the money would need to be expended to protect Government property we would be authorized to deal with it as an emergency, and we would also have the benefit of the 10 per cent transfer provision.

ACCOMPLISHMENTS IN ALASKA.

Mr. BUCHANAN. What are you doing in Alaska; are you getting any results from these experiment stations? I have heard various things about them.

Mr. EVANS. The work at the Alaska stations divides itself up into the work at different stations, where we have been carrying on investigations—at Sitka, which represents southeastern Alaska, horticultural work prevails; at Kodiak, where live-stock experiments are carried on; at Fairbanks, which is in the interior of Alaska, grain growing; at Rampart, on the Yukon River, where we have found a place exceedingly well adapted to grain breeding investigations; and at Matanuska, which represents the transition point between interior Alaska, with its intense winter cold, and the coast region where the temperatures are not so low and where the rainfall is much heavier and foggy weather prevails. At the interior stations I am very sorry to have to report to the committee this year that in spite of the fact that there was a larger acreage planted to wheat and other cereals than ever before, there will be but little grain, as a severe frost on the 27th of August practically destroyed it all. The year before—that is, the summer of 1921—there were 6,000 bushels of grain grown in the vicinity of Matanuska.

Mr. BUCHANAN. What yield per acre?

Mr. EVANS. Various ranges are reported—in some places as high as 35 bushels per acre, depending upon the location, the soil, etc. The average ranged from 25 to 35 bushels per acre. But the 3,500 bushels of wheat grown near Fairbanks in 1921 was grown by the farmers and not by the station. At the Matanuska station about 1,000 bushels of wheat was grown in 1921. The latest advice I had from those stations was that they thought they would save enough for seed purposes this next year, but that there would be very little for milling.

Mr. BUCHANAN. Is that the first time you noted frost in August?

Mr. EVANS. That is the first time we have had anything like a great failure of crops since we began work in the interior of Alaska in 1907. There is an ordinary annual average of 108 days without frost. This year it was less than 100.

Another thing that made the thing worse was the late spring, which was followed by an unusually rainy July, which kept the grain growing late into the season instead of letting it mature early, as commonly.

The other work we are putting in at Matanuska and Fairbanks is prospering very well. The development of our live-stock herds is making it very essential that we shall have more money for construction of buildings and for clearing and fencing land for pasture and growing forests.

HAWAIIAN EXPERIMENT STATION.

Mr. ANDERSON. I suppose the work is going on in these other stations as usual?

Mr. EVANS. They are going along as usual. In Hawaii the board of health in Honolulu is still insisting on our connecting with their sewerage system there instead of having open privies. That would cost about \$3,000. I would like to append a summary of the work for the past year at all the insular stations.

STATEMENT REGARDING THE WORK OF THE INSULAR EXPERIMENT STATIONS.

ALASKA STATIONS.

There are five agricultural experiment stations maintained in Alaska. This number is considered necessary on account of the great difference in climate and soils in large representative regions. Headquarters are maintained at Sitka, in southeastern Alaska, and much of the work with vegetables and small fruits is carried on at that station. Stock breeding work is carried on at the Kodiak Station, which represents the southwestern treeless region, and grain growing at the Fairbanks and Rampart Stations in the interior of the Territory where there is a light rainfall and comparatively high summer temperatures. Mixed farming is believed possible in the Susitna Valley region contiguous to the new Government railroad, and as a consequence, investigations with field crops, vegetables, small fruit, and animal husbandry have been begun at the Matanuska Station.

The season throughout Alaska was extremely backward in the spring of 1922 and growth was slow in beginning and was further prolonged in the interior by an unusual amount of rain and a great number of cloudy days. These conditions retarded the ripening of grain at the Fairbanks and Rampart Stations to such an extent that most of it was destroyed by frosts that occurred the last of August. This is the first time since the stations were established in 1907 that the majority of the varieties of cereals failed to mature. At the Fairbanks Station, from data collected since 1904, there is usually a frost-free period of 108 days.

The vegetable and small fruit work at Sitka is progressing satisfactorily. The work with hybrid strawberries is making good progress and about 2,000 hybrid plants were grown in the field during the past season. A large number of pedigreed plants from previous seasons' plantings have been tested further, and the best have been allowed to form runners and thus increase the stocks for cooperative trial elsewhere. The experiment of producing new seedling potatoes adapted to Alaska conditions is progressing and about 170 additional seedlings were grown this year. The best of the seedlings grown in 1921 were planted in increase plats this year and they will soon be ready for testing in other parts of the Territory. An opportunity was afforded the chief of the insular stations to observe, in July of this year, the reaction that has taken place in southeastern Alaska since the station was established. In 1897 there were seen but two creditable gardens in the whole region. In 1922 good gardens were observed at every village and town at which steamer landings were made, and many others were reported at places off the steamer route. In all the towns local supplies of vegetables of excellent quality were found in the stores, and locally grown strawberries were just coming into the market in some places, while raspberries, currants, and gooseberries were promising large crops.

Live-stock work has been taken up and made an important feature at the Matanuska and Fairbanks Stations in order to develop dairying and meet production in those regions. At the Matanuska Station there were 7 milking Shorthorn cattle, 6 Galloways, and 16 sheep at the beginning of the year. At the Fairbanks Station there were 3 milking Shorthorns, 3 Hampshire pigs, 4 milk goats and a pair of yak. The female yak died during the summer and this will temporarily interfere with the experiment of making reciprocal crosses with Galloway cattle. The presence of these breeding animals has called attention to the necessity for more adequate barns to shelter them and more

cleared and fenced land for pastures and forage production. At none of the stations is the area of cleared land under fence adequate for the support of the stock now on hand and to continue the crop work under the conditions pertaining in that country.

One of the great needs of Alaska is extension work in agriculture. Most of the homesteaders were formerly miners, fishermen, or lumbermen, and when funds are available it is desired to have an agent who will visit the various agricultural valleys and instruct the settlers regarding the best method and crops found by the stations.

HAWAII STATION.

The Hawaii station reports progress in its efforts to diversify the agriculture of that Territory. New forage crops, fruits, and vegetables have been successfully introduced, established, and distributed throughout the various islands. The value of the Kusaie lime and the Macadamia nut has been shown, and they are being widely planted. The variety of tomato originated by the station continues to be resistant to the Mediterranean fruit fly, and large numbers of plants have been distributed for extensive trial. The demand for the station's improved fruits and vegetables can not be met with the present facilities for the propagation of planting and budding materials.

The selection made from Guam corn has proved to be adapted to cultivation at low elevations and it has also been found to be an acceptable table corn, a distinct acquisition in the Tropics. Breeding experiments with sweet potatoes have resulted in the development of new varieties of great merit.

Owing to quarantine regulations only a few kinds of fruits can be shipped from Hawaii and there are often supplies in excess of local demands. The chemist has recently developed improved methods for the utilization of surplus fruits and vegetables by which much material that is now wasted can be used to a profit. There is said to be a rather common belief that locally grown vegetables are deficient in certain constituents, particularly lacking lime and iron. A preliminary test indicated there was little basis for this belief, but to determine it more definitely an experiment is in progress in which vegetables from the same lots of seed have been grown in two places in Hawaii, at the Arlington Farm, near Washington, D. C., and at Bellingham, Wash. The products will be subjected to analysis to determine whether there is any real inferiority on the part of Hawaiian grown vegetables. If no inferiority is shown there should be enlarged demands for locally grown produce. A special study is in progress of the salt content of irrigation waters and the limits of tolerance by crops in an effort to extend the irrigation supplies now available. In some places slightly brackish waters are found that it is hoped to use to a profit.

The agronomist in charge of the station has been repeatedly called upon for advice regarding the agricultural problems connected with the Hawaiian Homes Commission, which is seeking to locate native Hawaiians on farms on the island of Molokai.

The station is conducting experiments on the slopes of Haleakala on the island of Maui, where a homestead tract has been opened, and it has already found some crops that appear promising for that elevated region, which is subject to high winds.

The extension work authorized by Congress is progressing satisfactorily. On the island of Hawaii one man gives all his time to this work. Recently the manager of a large ranch has set aside a 10-acre tract and furnishes all the labor necessary to conduct demonstrations of agriculture suited to the region. Some home demonstration work has been begun on a part-time basis. This work has reached a considerable number of people representing many races, all of whom appear interested in the effort to improve the home life of the people and many requests have been received asking that the woman who is carrying on the work be employed on a full-time basis instead of only two days a week.

PORTO RICO STATION.

The Porto Rico station is continuing its policy of agricultural diversification for the island. Much attention has been given the live-stock industry, and through the example of the station the possibility of the eradication of the cattle tick has been demonstrated, and it is believed probable that an eradication campaign can be put on in a few years and the menace of tick fever removed from

the island. The station built the first dipping tank in Porto Rico and made its use free to all who would bring their cattle. So successful was this effort in improving the condition of the cattle that there are now more than 100 public and private dipping tanks in the island. Following the cleaning up of ticks on the station, dairy investigations have been taken up and by the use of pure-bred Guernsey sires the milk production of the station herd has been greatly increased. Similar work is needed throughout the island to produce larger and better milk supplies. The entomologist is continuing studies on the life history of the tick under Porto Rico conditions, and five years' data have been collected on their behavior under various conditions. He is also making a study of the insect transmission of the yellow stripe disease of sugar cane.

The chemists have found, so far as a single season's work is concerned, that ammonium sulphate used as a fertilizer reduced the sucrose and purity of sugar cane; also, that the so-called straight head disease of rice is due to excessive use of nitrogenous fertilizers on poorly drained soils. The horticulturist and plant breeders are actively engaged in the production of new strains and varieties of economic plants, and some very important results have been secured. The experiment with vanilla, which seemed so promising, has been given up on account of the presence of a root disease that destroyed nearly all the plantings at the station. This disease and scab of citrus fruits need investigation, but the station has no plant pathologist to make the studies. As a result of the station's work with vanilla, three commercial plantings have been made in Porto Rico. Porto Rico ships to the mainland grapefruit and oranges to the value of more than \$2,000,000 annually, but recently large losses have been experienced and considerable attention is being given to some of the problems connected with the packing and shipping of citrus fruit, data having been collected locally, on the vessels, and in the New York markets. It is believed that means for avoiding some of the losses have been found and a bulletin on the subject is in course of publication.

With the fall in the price of sugar an interest has become manifest in rice, and the station has resumed and extended its investigations with this crop. Unfortunately the station is not equipped with adequate irrigation facilities for proper work with lowland rice. A test was made of a number of varieties and satisfactory yields were indicated for some of them. A strain of Honduras rice grown as an upland crop yielded 1,300 pounds per acre.

GUAM STATION.

The Guam station, with its reduced income, has had to greatly contract some of its lines of work. The agronomist and horticulturist and the extension agent resigned, and their places can not be filled because of a lack of funds. This leaves but one scientifically trained man at the station. He acts as director of the station, disburses the funds, and keeps the experiments going, so far as he is able to do so. The station is poorly equipped for economical management on account of a lack of implements, machinery, and work animals, and this entails a large amount of hand labor which must be employed throughout the year. Again, on account of the limited area of the station at Piti and the impossibility of securing suitable land near by, much of the work with live stock is carried on at Cotot, some 8 or 10 miles away. The station has made an effort to improve the live stock of the island, and at the beginning of the year it had 8 Ayrshire, 1 Jersey, 53 grade, and 17 native cattle in its herds. It also had 30 grade goats and 8 pure-bred and grade Berkshire pigs, and it maintains a flock of about 100 chickens for breeding purposes. A new breed of poultry has been made by crossing the Rhode Island on a native strain, and a hardy race of bird has been obtained that is greatly superior to the native ones. It also has some pure-bred Morgan horses. These animals are all used to grade up the island's live stock, and there is a growing demand throughout the island for better stock. On account of transportation difficulties this is the only available source of breeding stock, and grade animals are disposed of for breeding purposes the station keeping the pure-bred ones. With so many animals a large amount of time and labor is required for providing pastures and forage. In addition to the breeding work, some feeding experiments are in progress to determine the value of available feeds, such as copra meal, beans, etc.

Since the departure of the agronomist and horticulturist the work along those lines has been greatly reduced, and it now consists of small-plot experiments with various tropical crops and the maintenance of the orchards already

planted. No comprehensive experiments are possible without a trained agronomist and horticulturist.

The extension work, begun so auspiciously, has suffered on account of the reduction in the appropriations. The work is maintained as well as possible, but the numbers now in the boys' and girls' club have diminished greatly and the value of last year's products is less than half the amount earned in 1921.

The building situation at the station is unsatisfactory and new buildings, as well as extensive repairs to the old ones, are urgently needed. Buildings in the Tropics, unless of concrete, deteriorate very rapidly, and the agent in charge reports several hundreds of dollars of repairs as urgent.

VIRGIN ISLANDS STATION.

The Virgin Islands have just gone through a period of two years of deficient rainfall. This has had a depressing effect on the agriculture of the islands, and it has most seriously interfered with the experimental work of the station, as there are no facilities for irrigation, and only meager supplies for the post and other experimental work and for the live stock. The rainfall for 1920 was only about 75 per cent of the normal, for 1921 about 65 per cent, and for the first half of 1922 less than 50 per cent. There are no streams of consequence in St. Croix, and rain water is almost the only source of supplies. The station desires to concrete an area of about 10,000 square feet on a hillside of gradual slope to serve as a catchment basin to aid in filling a reservoir from which an adequate water supply could be obtained for experimental work and for fire protection. It is now catching rain water from a combined area of about 3,000 square feet, but this is not sufficient in periods of light rainfall.

A change in the officer in charge of the station was made during the past year and J. B. Thompson, formerly of the Guam Station, is now in charge. The work formerly conducted on an extensive scale is being systematically reduced and put on a more definite experimental basis. Field work for crop production is no longer attempted. Before the station was taken over, its main support was secured in this manner, and it was difficult for the former agronomist to change his methods.

Crop improvement is an important part of the station's work, sugar cane, corn, and sweet potatoes being extensively experimented with. A variety of sugar cane, C. S. 12/4, originated at the station, continues to be the best for planting on certain types of soil. With the arrival of the new head of the station, experiments in vegetable production were taken up. As has been repeatedly pointed out, there is a scarcity of fruits and vegetables in the Virgin Islands. Plantings were made from September to December of a large number of vegetables, and satisfactory results were obtained with quite a large number of kinds and varieties. Insect pests were troublesome and plant diseases caused loss, but experiments are in progress to control these sources of trouble. Some of the experiments were carried through the summer, but the entire experiment is to be repeated this fall in the hope that definite suggestions for planting can be made.

The entomologist has made a study of the insect pests of cotton and truck crops and has prepared bulletins on the principal pests and their control. On account of the presence of the pink bollworm in St. Croix, the growing of cotton has been abandoned temporarily and all cotton plants on the island have been destroyed. It is expected that no cotton will be grown for at least two years, by which time it is hoped the insect will have been starved out.

Next to the production of sugar, stock raising is the most important agricultural industry of the Virgin Islands. The present race of cattle is a mixed type bred mainly for work purposes. A study has been begun of the station animals with a view to their improvement. Attention will be given not only to the production of work animals, but an attempt will be made to improve the dairy qualities of certain promising strains now present.

There is great need for some kind of extension work on the islands. The former glory and importance of the harbor of St. Thomas has passed, and transshipping and supplying vessels no longer furnish as much employment as in the past. Aside from those working in the cane fields, the people appear quite ignorant of agriculture and gardening, and they need instruction in the elements of food production. Some preliminary work in garden demonstration was begun on St. Thomas last season, but as the agronomist was compelled to return to St. Croix and could not revisit St. Thomas for several weeks the experiment was a failure through a lack of understanding of the necessity of further work in the cultivation of the several crops.

EXTENSION SERVICE.

STATEMENTS OF DR. A. C. TRUE, DIRECTOR STATES RELATIONS SERVICE, AND MR. D. M. GREENE, OFFICE OF EXHIBITS, DEPARTMENT OF AGRICULTURE.

SALARIES.

Mr. ANDERSON. Doctor, this statutory roll of the Extension Service appears to be new. Perhaps you had better tell us how it is made up.

Doctor TRUE. That is made up principally by transfer from the roll of the States Relations Service, but it includes also provision for some places taken from the Division of Publications. That is explained by some notes, copy of which you have.

Mr. ANDERSON. That does not help the rest of the members of the House. I think you had better give us a general statement at least in the hearing of how the list is made up.

Doctor TRUE. There is in this also an apparent increase of \$23,700, but an actual decrease of \$5,260, covering several places dropped from the statutory roll of the States Relations Service. Those, as I understand it, are these: There are three clerks at \$1,100 each; total \$3,300; one at \$1,000; one messenger boy at \$480, transferred to the editorial office, and then one messenger boy dropped.

Mr. ANDERSON. Suppose you just put that statement in the record and we will let it go at that.

Doctor TRUE. Well, we can do that.

Extension Service (formerly part of States Relations Service) statutory salaries.

Apparent increase, \$23,700; actual decrease, \$5,880, as follows:

Places dropped:

| | |
|-------------------------------|---------|
| 4 clerks at \$1,100 each..... | \$4,400 |
| Clerk | 1,000 |
| Messenger boy | 480 |

Actual decrease..... 5,880

Transfers from statutory roll, office of Editorial and Distribution Work (Division of Publications), which has been correspondingly reduced:

| | |
|--|---------|
| Assistant in charge of office of motion pictures, with change of title from assistant in charge of motion-picture activities | \$3,000 |
| Chief cinematographer | 2,500 |
| Assistant editor | 1,800 |
| 2 clerks, class 4 | 3,600 |
| 3 clerks, class 2 | 4,200 |
| 3 clerks, class 1 | 3,600 |
| Clerk | 1,100 |
| 2 draftsmen or photographers at \$1,600 each | 3,200 |
| One draftsman or photographer | 1,500 |
| 2 clerks at \$960 each, with change of title | 1,920 |
| Laboratory aid | 900 |
| Assistant photographer | 960 |
| Messenger or laborer | 840 |
| Do | 720 |
| Messenger boy | 720 |
| Do | 600 |

31,160

Transfers from lump-fund, Extension Service (States Relations Service), which have been correspondingly reduced:

| | | |
|---|---------|--------------|
| Executive clerk (from farmers' cooperative demonstration work)----- | \$2,000 | |
| Clerk, class 2 (from farmers' cooperative demonstration work)----- | 1,400 | \$3,400 |
| | | <hr/> 34,560 |

Transfer to statutory roll, office of the Secretary. and the roll reduced accordingly:

| | | |
|--|---------|--------------|
| Director, with change of title----- | \$4,500 | |
| Transfer to statutory roll, Office of Editorial and Distribution Work, and the roll reduced accordingly: | | |
| Messenger boy----- | 480 | 4,980 |
| | | <hr/> 29,580 |
| Apparent increase----- | | 23,700 |

Places substituted: Messenger boy or laborer, at \$480, substituted for messenger boy, at \$480; 2 charwomen, at \$240 each, substituted for messenger boy, at \$480.

Change of title: Assistant in charge of motion-picture activities, \$3,000, changed to assistant in charge of office of motion pictures, \$3,000; 2 clerks, at \$960 each, changed to 2 laboratory aids, at \$960 each.

Mr. BUCHANAN. There is no increase of salaries, is there?

Doctor TRUE. No increase of salaries.

Mr. BUCHANAN. No increase of personnel or salary?

Doctor TRUE. No, sir.

Mr. BUCHANAN. There has been quite a decrease in personnel that happened this year. You do not mean to say that decrease has been brought about by this arrangement, do you?

Assistant Secretary PUGSLEY. Yes; by the consolidation of the offices of the North and South.

Mr. BUCHANAN. I mean to say, under this new arrangement?

Assistant Secretary PUGSLEY. No; that has not been possible, because it has not gone into effect yet.

FARMERS' COOPERATIVE DEMONSTRATION WORK.

Mr. ANDERSON. The next item is on page 30, for farmers' cooperative demonstration work, which includes special investigations of plans and methods for more effective dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations, etc. Your estimate is for \$1,284,350.

Doctor TRUE. Yes, sir. That is a decrease of \$15,650 in that item.

Mr. ANDERSON. What becomes of that \$15,000 reduction? Is it saved?

Mr. JUMP. These are some of the transfers to the Secretary's roll about which you have been told by Mr. Reese. There were two of the detailed clerks transferred from that roll. A reduction of \$5,000 is also made in that roll in order to provide for the new place of assistant in charge of the office of editorial and distribution work at a salary of \$5,000. This fund is reduced in order to provide the \$5,000 for that.

Mr. BUCHANAN. You created that new position at the expense of some other fund in another place. Is that true?

Mr. JUMP. Yes; that is it; so we would not have to be asking for any increase outright.

COOPERATIVE AGRICULTURAL EXTENSION WORK.

Mr. ANDERSON. The next item is on page 32, for cooperative agricultural extension work.

Doctor TRUE. That is the so-called supplementary Smith-Lever extension work, and that has been decreased by \$50,000. It is \$1,250,000.

Mr. ANDERSON. Would you mind telling us why you took that \$50,000 off?

Doctor TRUE. It was done by the Budget Bureau.

Mr. ANDERSON. Is this money used for payment of county agents' salaries?

Doctor TRUE. Yes, sir; almost entirely. You will notice a proviso in it that of the above appropriation not more than \$300,000 shall be expended for purposes other than the salaries of county agents. As a matter of fact, the appropriation last year of \$1,300,000, according to the budgets submitted to us by the States for the present fiscal year, has \$1,168,173 allotted to county agents.

ALLOTMENT OF MONEY FROM ALL SOURCES.

Mr. ANDERSON. Last year, if I remember right, you furnished us with a statement showing the disposition of this fund, the fund appropriated under the preceding item and the funds under the Smith-Lever Act, amounting to some eight or nine million dollars altogether, as between county agents, home economics, specialists, etc. Have you such a statement for the next fiscal year?

Doctor TRUE. We would not have that for the next fiscal year, but for the present fiscal year I have a statement here, which, however, does not go so much into detail.

Allotments of Smith-Lever agricultural extension appropriations by sources of funds and lines of work.

| Items. | All sources. | Federal, Smith-Lever. | State, Smith-Lever. | Supplementary Federal, Smith-Lever. | Supplementary State, Smith-Lever. | Farmers' cooperative demonstration work. |
|--------------------------|--------------|-----------------------|---------------------|-------------------------------------|-----------------------------------|--|
| Total: | | | | | | |
| 1922-23..... | \$18,819,894 | \$4,580,000 | \$4,100,000 | \$1,300,000 | \$1,300,000 | \$1,027,981 |
| 1921-22..... | 18,497,360 | 4,080,000 | 3,600,000 | 1,500,000 | 1,500,000 | 1,050,754 |
| 1920-21..... | 16,836,743 | 3,580,000 | 3,100,000 | 1,500,000 | 1,500,000 | 1,028,850 |
| Administration: | | | | | | |
| 1922-23..... | 1,014,569 | 519,090 | 321,178 | 3,007 | 698 | 10,350 |
| 1921-22..... | 1,009,847 | 478,807 | 301,448 | 5,729 | 3,456 | 16,920 |
| 1920-21..... | 951,185 | 464,337 | 277,326 | 3,551 | 89 | 14,941 |
| State-wide field agents: | | | | | | |
| 1922-23..... | 5,573,944 | 2,481,866 | 1,584,036 | 128,127 | 55,261 | 308,334 |
| 1921-22..... | 5,437,573 | 2,221,866 | 1,647,525 | 46,040 | 88,864 | 376,292 |
| 1920-21..... | 5,259,430 | 1,937,935 | 1,493,099 | 58,697 | 40,690 | 392,631 |
| County workers: | | | | | | |
| 1922-23..... | 11,873,670 | 1,442,502 | 2,099,573 | 1,168,173 | 1,242,661 | 709,297 |
| 1921-22..... | 11,740,657 | 1,264,341 | 1,545,611 | 1,439,843 | 1,407,249 | 657,542 |
| 1920-21..... | 10,380,326 | 1,066,896 | 1,248,090 | 1,436,725 | 1,455,848 | 619,278 |
| Publications: | | | | | | |
| 1922-23..... | 357,711 | 136,542 | 95,213 | 693 | 1,380 | ..... |
| 1921-22..... | 309,283 | 114,986 | 105,416 | 8,388 | 431 | ..... |
| 1920-21..... | 245,802 | 111,336 | 81,496 | 1,027 | 373 | ..... |

Mr. ANDERSON. I notice under one item here that you have state-wide field agents for which you made an allotment of \$5,573,944. What are these state-wide field agents?

Doctor TRUE. They are people who work a large share of the time in the counties but who have their headquarters either at the college or some point in the State.

Mr. ANDERSON. Are they specialists, commodity experts, or organizers, or what are they?

Doctor TRUE. Two kinds of agents are included in this statement, (1) a considerable number representing different subject matters, such as dairying and food and nutrition, and (2) others who go out to assist the county agents in the organization of the work, methods of instruction, etc.

Mr. ANDERSON. Is part of the salary of these state-wide agents paid by the State as well as by the county?

Doctor TRUE. The state-wide agents are paid either by the college or in part by the department out of the farmers' cooperative demonstration appropriation.

Mr. BUCHANAN. The county is paying what part of the salary?

Doctor TRUE. The county is paying no part of their salaries.

Mr. BUCHANAN. Can you give me any idea of the division of the \$11,873,670 which goes to county workers, as between county agents, home demonstration agents, and other people?

Doctor TRUE. Yes, sir; for the county agricultural agents, \$8,974,806; for the home-demonstration agents, \$2,347,761; and for boys' club leaders, some of whom are men and other women, \$551,103.

NUMBER OF AGRICULTURAL COUNTIES AND AGENTS.

Mr. BUCHANAN. How many counties have you county agents in now?

Doctor TRUE. About 2,100.

Mr. BUCHANAN. How many agricultural counties are there in the country?

Doctor TRUE. We count about 2,650.

Mr. BUCHANAN. Two thousand six hundred and fifty agricultural counties, and you have about 2,100 counties with extension agents.

Doctor TRUE. We have about 2,100.

Mr. BUCHANAN. Are there many that have more than one agent?

Doctor TRUE. Only a few counties.

Mr. BUCHANAN. How many?

Doctor TRUE. Do you mean by one agent agricultural agent?

Mr. BUCHANAN. Yes.

Doctor TRUE. Probably not more than 100 in the United States. Most of them are in some New England States or in counties where they have plenty of money for extension work.

Mr. BUCHANAN. And they are, I suppose, in the diversified areas where you have a county agent that devotes himself to a particular crop?

Doctor TRUE. Yes, sir. In New York, for example, in the Lake region they have agents who deal with fruit growing.

Mr. BUCHANAN. How many regular home economic workers have you doing work in the county as agents?

Doctor TRUE. Eight hundred and one.

Mr. BUCHANAN. Does that cover all the counties that want this kind of work and are willing to pay for it?

Doctor TRUE. I would say practically so, under present conditions.

Mr. ANDERSON. I had a letter a few days ago from a lady down in Florida who complained very bitterly because she said that the home economics end of the proposition was not receiving the attention which the county agricultural agents are. She thought there should be as much money appropriated for home economic workers as for county agents. What do you think about it?

Doctor TRUE. I do not think that is a practical proposition. The counties do not feel that they are able to contribute beyond what they are contributing now. There is a constant effort on the part of the colleges and ourselves to stimulate the women's work, and wherever there is a favorable opportunity to put in a home demonstration agent it is done.

DISTRIBUTION OF FIELD AGENTS.

Mr. ANDERSON. How many of the state-wide field agents contribute directly to the home economic work?

Assistant Secretary PUGSLEY. All of them who are women—

Mr. ANDERSON. That does not answer the question.

Assistant Secretary PUGSLEY. And many of the men.

Mr. ANDERSON. That still does not answer the question.

Assistant Secretary PUGSLEY. We have not those figures. We can insert that in the record.

Doctor TRUE. There are about 125 women field agents dealing with food and diet, clothing, household equipment, etc.

Mr. ANDERSON. Doctor True, will you put into the record or furnish me with a statement—I do not care which—that will show the distribution or classification of the workers employed under this as state-wide field agents? I supposed these county workers included only county units.

Number of extension employees, November, 1922.

| | |
|--|--------|
| County-agent work (men): | |
| Directors and State leaders..... | 51 |
| Assistant State leaders and district agents..... | 108 |
| County agents and assistants..... | 2, 112 |
| Local agents (colored)..... | 172 |
| Total..... | 2, 443 |
| Home demonstration work (women): | |
| State leaders..... | 44 |
| Assistant State leaders and district agents..... | 68 |
| County agents and assistants..... | 776 |
| Local agents (colored)..... | 114 |
| City agents..... | |
| City agents (colored)..... | |
| Total..... | 1, 000 |
| Boys' and girls' club work (men and women): | |
| State leaders..... | 42 |
| Assistant State leaders..... | 58 |
| County leaders..... | 181 |
| Total..... | 281 |

State-wide subject-matter agents:

| | |
|------------------|-------|
| Agriculture— | |
| Full time..... | 547 |
| Part time..... | 165 |
| Total..... | 552 |
| Home economics— | |
| Full time..... | 120 |
| Part time..... | 8 |
| Total..... | 128 |
| Grand total..... | 4,504 |

Doctor TRUE. County workers include both men and women.

Mr. ANDERSON. They are divided into home and club and other workers?

Doctor TRUE. Yes.

Mr. ANDERSON. This statement for which \$1,014,569 is appropriated for administration shows what? That includes, I take it, only the Federal end of the administration of it?

Doctor TRUE. That is the State end. All those figures you have represent the moneys that are spent in the States. They do not include the amounts spent in maintenance of our Washington office.

Mr. ANDERSON. Of what does this administration in the States consist?

Doctor TRUE. That includes the expenditures for what is known as the extension director's office, his own salary and that of his clerical assistants, accountants, people who are preparing charts and illustrative material, or who are engaged in handling the manuscript work, etc. Of course a great many publications are issued and it involves a large amount of preparation done by routine workers getting the manuscripts in shape and seeing them through the press.

DUPLICATION IN PUBLICATIONS.

Mr. ANDERSON. What is the distinction between the publications issued under this fund here and the ordinary, regular publications of the department?

Doctor TRUE. The publications issued under the Smith-Lever Act by the colleges are distinct from the department publications. There is a special provision for publications in the Lever Act up to an amount not to exceed five per cent of the appropriation.

Mr. ANDERSON. I understand the financial distinction but what I want to know is the distinction in the character of the publications if there is any.

Doctor TRUE. The States get out a larger number of special subject matter publications for use in extension work.

Mr. ANDERSON. Is there any effort made in this publication matter to avoid duplication of publications as between those issued by the State and those issued by the Federal Government?

Doctor TRUE. I do not think there is any duplication.

Mr. ANDERSON. I think there is quite a lot.

Doctor TRUE. The department issues only a few publications especially designed for use in extension work.

Mr. ANDERSON (interposing). That is what I am trying to get at. If these publications are different and written for the purpose of the States Relations Service only, that is a distinction.

Doctor TRUE. We do not allow publications under the Smith-Lever Act unless they are distinctly publications prepared for use in extension work.

Mr. ANDERSON. How are they used in extension work?

Doctor TRUE. They are distributed very largely through the county agents and they are also sent out from the colleges by request of the people in the State, and they are used in connection with the extension schools, farmers' institutes, etc.

Mr. ANDERSON. Are they sent out to individuals by the college the same as farmers' bulletins are sent out by the Department of Agriculture?

Doctor TRUE. Yes. They are also distributed to individuals by each county agent, to people who come to visit him or at meetings. Any extension publication that is applicable to any problem brought to the county agent is given to the individual who brings up the subject.

Mr. ANDERSON. What supervision do you exercise over the publication of these publications to make certain that they do not duplicate the publications which are already issued or about to be issued by the Department of Agriculture?

Doctor TRUE. The Department of Agriculture gets out very few subject-matter publications especially for extension work. Such publications as farmers' bulletins are for general distribution. But the number of new farmers' bulletins issued each year by the department is very limited. The States are getting out many publications suited to local conditions.

Mr. ANDERSON. They spend pretty nearly as much money as you do. They ought to get out some farmers' bulletins for that amount.

Doctor TRUE. The extension publications they get out are especially intended for use in extension work.

Mr. ANDERSON. Perhaps I am dense, but I would like to get a distinction between extension bulletins and farmers' bulletins.

Assistant Secretary PRUSLEY. Perhaps I can make a statement on that, drawn from my own experience in the States as well as in the department. The publications of the State agricultural colleges, including the extension service and experimental service, are clearly State publications written for the most part by State people; covering, if they are research bulletins, work that is done within the State by the State workers; covering, if they are extension bulletins, work which may be done there, and if not done there, they are publications very valuable to the work that is done within the State. These have the local point of view much more dominant than the Federal publications. There is no effort on the part of the Federal Government to say to a State, "You can not publish a bulletin on spring wheat in Nebraska for the use of your extension worker, because the Federal Government at Washington has a bulletin on that subject." There is undoubtedly some duplication in the publications in the department and the States, just the same as there is undoubtedly duplication in the experimental work, but most of the money which is put into the extension publications in the State is State money rather than Federal money. There is shown in this state-

ment not any of the State money that is put into the State publications other than Smith-Lever offset. The State spends much more for its publications than is shown on this list; many of the college publications are extension publications.

Now, if you are directing your question to whether or not there is effort on the part of the Department of Agriculture to avoid duplication of publications, the answer to that is that there is not any conscious effort at the present time. But I would like to add the thought that I think there is little serious duplication, and that it might be well to take the matter up with the State colleges to see if duplication can be avoided.

MR. ANDERSON. Of course, I do not believe the Federal Government ought to undertake to censor the publications which may be issued by the State for the education of its own citizens. But I do think where Federal money is spent in publishing documents for citizens of a State that it might be wise to see that that money is spent in such a way that it does not duplicate expenditures already being made for Federal purposes. I think that is as far as we can go, but it seems to me we can legitimately go that far.

Assistant Secretary PUGSLEY. The way it works out is practically like this: An extension director in a State finds a need for bulletins on a certain subject for use of county workers. He scans not only the State bulletin list but the Federal bulletin list available for that purpose; he may find the Federal bulletin on that subject is not local enough and then he asks for the publication of a bulletin to cover his territory. Or he may find that the supply of Federal bulletins is not sufficient to meet the need of his county workers and he publishes a bulletin written by the workers of the same State, in which they incorporate many of the things contained in the Federal bulletins.

MR. ANDERSON. There is no increase in the total amount available for publication work under the Smith-Lever Act for the next fiscal year, is there?

Doctor TRUE. No, sir.

MR. ANDERSON. That act is entirely matured, is it not?

Doctor TRUE. Yes, sir.

STATEMENTS OF MR. G. I. CHRISTIE, DIRECTOR OF EXTENSION, PURDUE UNIVERSITY, LA FAYETTE, IND.; MR. B. H. CROCHERON, DIRECTOR OF AGRICULTURAL EXTENSION, UNIVERSITY OF CALIFORNIA COLLEGE OF AGRICULTURE; MR. T. O. WALTON, DIRECTOR OF EXTENSION SERVICE, STATE COLLEGE OF AGRICULTURE, TEXAS; AND MR. W. M. JARDINE, PRESIDENT KANSAS STATE AGRICULTURAL COLLEGE.

FOR COOPERATIVE AGRICULTURAL EXTENSION WORK, ETC.

MR. ANDERSON. The committee will return this morning to the items on pages 30 and 32 for farmers' cooperative demonstration work and for cooperative agricultural extension work, which were formerly under the States Relations Service and which are proposed in this estimate to be placed under the office of extensions. We will hear the representatives of the land-grant colleges this morning.

Mr. CHRISTIE. Mr. Chairman, we seek an opportunity this morning to say a word with reference to the supplemental Smith-Lever appropriation.

This appropriation, as is perhaps well understood, is the result of an attempt to supplement the appropriation provided in the regular Smith-Lever Act. We received a year ago \$1,500,000, and this current year we are receiving \$1,300,000.

We understand that the Director of the Budget has recommended a cut of \$50,000. In view of the fact that the Smith-Lever appropriation has reached its maximum, that the extension work in the States is not developed to its maximum, and that the demand is greater than ever before we feel that the recommendation of the Secretary of Agriculture that the supplemental appropriation be fixed at \$1,500,000 should receive serious consideration.

INCREASED EXPENSES DEMAND LARGER APPROPRIATIONS.

The unusual conditions which now prevail, with higher railroad fares, higher costs of living, and higher cost of operation of automobiles have caused the cost of extension work to more than double since we started. It is impossible with present finances to carry out the plans that were in mind at the time the Smith-Lever Act was passed.

This supplemental appropriation is used to make up for some of those unusual factors and conditions and to help out the States in doing the big things that are needed to be done.

Anyone acquainted with the extension work in the States knows that the farmers are demanding more help to-day than ever before. The unusual economic situation causes these farmers to seek definite help. The agricultural colleges are attempting to do everything possible through the county agents and through the extension service to render assistance to the farmers, and we know that a great work has been accomplished.

Congress decided upon the Smith-Lever Act not in the heat of war, not when an emergency was pressing upon the country, but when this whole situation was more or less normal. We are trying to carry out a work outlined by Congress. We sincerely hope that Congress will give us support at this time to develop the program. During the past three years farmers have been going through a very unsatisfactory situation. As a result of the depression following the war it has been necessary to modify our whole organization. But it is impossible to maintain an educational working force if appropriations are withdrawn. The work demands larger appropriations rather than less.

Mr. ANDERSON. When this supplemental fund was originally provided the Smith-Lever Act was three years behind in maturity, and the idea at that time, as I recall it, was to mature immediately instead of year by year, and the expectation of some members of the committee was that as the Smith-Lever funds matured the supplemental fund could be reduced correspondingly. I recognize the fact—and I suppose the other members of the committee do, generally—that there have been increases in operating expenses, which probably make the course originally intended impossible. But I do not think

it is quite accurate to assume that at the time this supplemental fund was established anybody supposed that it was to be a permanent appropriation.

Mr. CHRISTIE. I think you are right, Mr. Chairman. But it was hoped—and it surely has been the hope of everybody—that we would return to a more or less normal basis. Unfortunately, we have not returned to that basis.

COUNTY AGENTS AN IMPORTANT FACTOR.

Then, there is another factor. When the Smith-Lever Act was passed we had the county agent only. In addition has come the greatest demand for home demonstration work and boys' and girls' club work. It has been necessary to advance those interests and develop that side of the work. Naturally the cost has increased and has placed a burden on the institutions on that account. Taking these factors all into consideration we can not handle all the work with only Smith-Lever funds. While I understand that Congress hoped that the Smith-Lever fund would meet the needs of extension work, conditions have changed since the passage of that act. If we could go back to the previous situation, with railroad fares at 2 cents a mile, gasoline at 11 cents, with meals from 35 to 50 cents, as they were when we began this work; if we could go back to a basis of a lower cost of printing and other reasonable expenses, then we could do as much work with the Smith-Lever fund as we are doing with the Smith-Lever fund and the supplemental fund.

Mr. ANDERSON. I do not fool myself with the idea that that time is coming.

Mr. CHRISTIE. That is the unfortunate condition we are experiencing at this time. I do wish to impress this fact, that the agricultural colleges, the United States Department of Agriculture, and the Secretary of Agriculture himself have all given this whole matter very serious consideration. It is not a matter of supporting the department in connection with the performance of this work, or of supporting the agricultural colleges, but it is a matter of trying to render service to the farmers at this time—service which I think is greatly needed.

PROBLEM OF ORGANIZING AGRICULTURAL PRODUCTION.

Mr. ANDERSON. I would like to ask you one question, if I can express myself so our minds will meet on it. To what extent is the extension service giving its attention to the problem of organizing agricultural production?

Mr. CHRISTIE. I wonder if you would mind just developing that a moment.

Mr. ANDERSON. What I have in mind is this: I am pretty thoroughly convinced in my own mind that one of the very large factors which influence the cost of distribution, particularly, is the fact that the farmer sells in small quantities and sells an unstandardized product very largely. There is no substantial effort made to standardize the production in areas so that the bulk of the product goes into primary or terminal markets and thus makes the cost of handling less.

I had in mind also what I think is the need, not only in agricultural distribution but in distribution generally, the intensified use of markets close at hand instead of an attempt to spread the distribution all over the United States, because it is cheaper to sell to a hundred customers who live within a radius of 100 or 200 miles than to sell to a hundred customers scattered all over the United States. I do not know that this proposition is an extension proposition particularly; I do not know that we have a basis upon which it could be made part of the extension work, but I think that is the real agricultural problem to-day. If we could apply one-hundredth part of what the Department of Agriculture now knows about production to that problem, we would not need to make much research for some time to come.

Not that I think we ought to stop the research work, but I think our problem there is one of the application of known methods to a far greater extent than it is the development of new methods. That, I think, is the job which the extension service has. But beyond that I think our problem is largely one of organized production, because I can not see very much hope of improving either production or distribution methods without a sounder organization of production itself. In other words, with the unorganized character of the industry all that you gentlemen can do to a large extent is to send up a general barrage, in the hope that some of it is going to hit some part of the problem. You can handle a good many individual cases, and doubtless you do, but yet a large part of our effort, I think, is wasted, because we have not the organization of production to make it effective. That is what is in my mind.

Mr. CHRISTIE. Mr. Chairman, that is an excellent idea, and one that I think every man in the agricultural colleges will agree to.

Our agricultural colleges are doing something along that line. We have been handicapped during the war, due to the extremely high prices and the willingness of the trade to receive almost anything. We do find in our districts, for instance, many varieties of wheat, many of them of poor quality, because the millers have not been willing to stand by the grade and reimburse a fellow a little extra for the good quality. But to-day the millers are realizing that they can cut down the high freight rate if they will use the grain at home. If they are going to use the wheat grown near the local mills, it must be wheat of one quality. The reason why many of the large flour mills have been able to sell their flour in the Middle West is because they have been able to standardize their flour—one sack is very much the same as the other. But where the local mills use one variety of one quality to-day and another variety of another quality to-morrow one sack is absolutely different from the other—the bakers can not use it.

In our State we have developed a new variety of wheat, known as the Michakoff, by crossing a local variety of good quality with a Russian variety, getting a hard, red winter wheat which is as hard as the Kanred wheat of Kansas, which is one of our standard good winter wheats.

Our millers to-day are willing to contract with our farmers, offering 10 to 25 cents a bushel above the market price for a period of five years for this variety of wheat. They would be able to save

about 25 cents a bushel on freight on hard wheat imported into Indiana. The Kansas institution has done a wonderful work in developing the Kan Red wheat. Michigan has done the same with the Red Rock wheat, and Wisconsin and other States have put out many varieties of excellent grains.

We are in a position now to do big work, Mr. Chairman, because the farmers are realizing they must do something to help themselves. There is a spirit to-day which has not been present in any large measure heretofore. California has had that idea in their cooperative marketing. They recognized the need for good varieties of apples and grapes in large enough quantities to warrant carload lots. They have given a demonstration of what can be done. You have emphasized one big point, which must have consideration.

Mr. ANDERSON. We will be very glad to hear the other gentlemen.

AGRICULTURAL EXTENSION WORK IN CALIFORNIA.

Mr. CROCHERON. Mr. Chairman, I am here primarily in the interest of the Western States in this supplemental Smith-Lever item, which we believe should be \$1,500,000. The State of California is putting \$3 into agricultural extension work for every dollar from the Federal Government. Even the little State of Nevada, with 90 per cent of its land in the hands of the Federal Government and 10 per cent of the land paying the entire taxes of the State, is putting up \$3 to every dollar from the Federal Government. New Mexico, with all its difficulties, is still putting up \$2 to every dollar from the Federal Government. I think it speaks well for the appreciation of the legislative bodies of the States and counties involved in the West. The Smith-Lever Act has always been manifestly inadequate for the needs of the States which had a relatively small rural population. It is true that our populations are growing and that the number of farms is increasing. One-third of the new farms in the United States between 1910 and 1920 are in California. Our farms increased from 87,000 to 110,000 in that decade. That makes a great burden upon our agricultural extension service.

Of the eight leading counties in the United States in agricultural production, according to the last census, five of them are in California; of the 50 leading counties in the United States, 16 are in California; and yet our proportion of the Smith-Lever appropriation and of the supplemental appropriation, divided in the same ratio, is relatively small. Our States have recognized that and have done what they could to help correct it, but the fund is still inadequate.

The State of California is putting altogether this year a total of \$609,000, from Federal, State, and county sources, into the work and is reaching 90 per cent of the farmers in an organized way. The other 10 per cent are so diffused that we can not reach them.

RESULT OF REDUCTION IN APPROPRIATION.

The amount of money involved by a reduction from \$1,500,000 to \$1,250,000 is serious, but not perhaps so serious, to my mind at least, as is the fact that the Federal Government, seemingly at least, might

be supposed to be lessening its support of this enterprise, which the States have so well supported.

The discouraging conditions in different parts of the West which have been badly affected by the drought for several years; the conditions in Montana of uncollected county taxes; the conditions in Nevada, with great counties with only a few farms, and the attempt to make farming there successful, and the cattle conditions, which have been so serious, make it appear that the problem is one perhaps quite as much of moral as financial support to this enterprise.

The Western States have met their problem as best they can. I do not know whether one always appreciates how difficult it is to carry this assistance to these people who are settling on the land and who need help in all phases of irrigated farming. They do not know how to apply the water to the land. They come from the Middle West and Eastern States, and they need help at all stages of the enterprise. I do not know whether it is fully appreciated here how difficult it is to make this work successful and how much service they need and what an expensive thing it becomes. Take the fact of the increased cost of transportation. If it is true in the relatively small counties of the highly developed States, it is certainly far more largely true in the big counties of the West. In my own State of California one county is as large as the States of Massachusetts and Connecticut put together, and to attempt to have one county agent cover that territory is manifestly impossible. We have had to put three men in there, and even then we are only scratching the surface.

EXTENSION WORK IN KANSAS.

Mr. JARDINE. Mr. Chairman, I am interested in this item because the farmers in Kansas—and I have gone over the situation with the Representatives of Nebraska—are in a serious need of light. They are in trouble. The farmers of Kansas are looking to the agricultural colleges for help as they never have looked to them before. Many of the farm organizations that have endeavored to function in the last four years have had difficulties, and they are coming back to the colleges for good, sound, advice. We did not stam pede them; we tried to state the difficulties and to present the fundamentals, and they are coming to believe that the suggestions they are getting from us are the ones that they need and should put into use in the development of their agriculture.

Referring to the supplemental fund I had the understanding you have expressed, that it was merely to tide over the period until we could get back to reasonable prices again. But however that may be, the costs of operation are very expensive, and we have not been able to develop the provisions of this act as it was intended they should be developed under the original act.

We have 103 counties in Kansas. We are now serving 60 of them, and there is a demand from the other counties for help. We have only been able to reach the demand of a few of our farmers. We ought to be able to reach all of our farmers. If it is good for some of our farmers, for those we have been reaching, the ones who were seeking light, we ought to push this out to the others, now that they

are in trouble. When an individual is in trouble he is more likely to come and ask for help. That is the case in Kansas, where we are practically at a standstill this year. If this item is going to be reduced for next year we must curtail our work, and it will not be a good thing to do. If we are going to pull ourselves out of the mire, it will be done by placing the facts in reference to their business in the hands of the farmers. I think you hit the nail on the head, Mr. Chairman, when you mentioned organization of agricultural production. I think if we could teach the men who are producing eggs, how to pack their eggs properly and bring them into the market in attractive containers, we would be doing a good service. Then, I think, we have to go to the business men in the cities and get them to see the light. They must be willing to pay a premium on these particular eggs.

We must educate the retail men. I am spending some time in talking to chambers of commerce and rotary clubs. Members of those organizations are inviting the farmers in to have dinner, with the idea of talking these problems over, and they are getting to understand each other better than ever before. We should have a common understanding between the business men of the cities and the farmers before we can get what you have suggested. It has to be done through the business men and the farmers themselves. The farmers are not going to do it alone. They do not know how. We must have men who can come in and help us, who know how to organize, who know how to get the products to the markets, so that they can be readily sold. We have to get at the advertising men. I am talking to the advertising men here at noon to-day along this particular line. They have never taken that proposition into account. They have forgotten that agriculture is producing from twenty-two to twenty-four billion dollars worth of products. No one has yet thought about trying to sell the farmers' goods, yet the advertising men have sold the manufacturers' goods, which are sold to the farmers. I am trying to interest big business men—bankers and men of that type—in this problem as well as the farmers. It is more than a mere farmers' problem.

We are at a standstill. I hope and believe you will do anything you can to strengthen this appropriation and bring it back to a million and a half. We need to serve more farmers than we are able to serve now. They have come to regard us in a much more favorable light than they did five years ago. They are relying on us, but we can not meet the demands on us. We are sending out our teachers instead of having them give their entire time to the instruction of students. We are carrying the instructions to the farmers, and we are giving the students the work only in a condensed form as they need it. If we can not furnish more light on agriculture to the individual farmers, then I do not see any salvation. It is through education that we will have to do it, and the extension work is an educational program. There is too much propaganda going on, too much stuff being preached by demagogues. We need to give the farmers sound advice now, and we need all the money we can get for this extension service to carry on the kind of work we have been doing in the last 18 months.

Mr. ANDERSON. Let me ask you or Mr. Christie, or both of you, this one question: Has there been any indication of a disinclination on the part of the farmers in connection with this work on account of the general desire for reduction in taxation—any indication of an intention to cut down the salaries or the amounts they are appropriating for county agents?

Mr. JARDINE. Speaking for Kansas, we have had certain county commissioners who have always wanted to cut down and never raise. But speaking for this year, I think there is a more generous response than ever before in our State. I know of several counties which in the last two months have increased the amount appropriated more than we even asked for these counties. I want to call your attention to this fact, that everywhere we are putting into the counties from Federal and State funds the largest appropriations we have ever received in our State. The county commissioners were opposed to this proposition two or three years ago, but they are coming back to it now. They see the light and they see where we have save crops—for instance, through the elimination of grasshoppers. We distributed 84 carloads of poison in 36 different counties, and we cleaned up the grasshoppers through the county organizations. We have also gone into counties where we have eliminated the chinch bug, and we are working to gether as never before. The county commissioners realize the benefits of it now. They are trying to cut down taxes, but I do not see any evidence of it in this work. We have more supporters for the farm bureau than we have ever had before.

Mr. CHRISTIE. Of course, Mr. Chairman, in some of the States we have some people who feel that the way to economize is to cut down on the county agents, but when the matter gets to a vote on the part of the county commissioners and on the part of the farmers themselves the appropriations in most counties are sustained. To-day we have in the neighborhood of 86 county agents in the State of Indiana, and we have appropriations of money available in the other 6 counties, making the 92 counties, complete. While there has been some opposition, as naturally would be expected with the unrest which has prevailed, a majority of the people have come forward and said that we must sustain this extension work, and it stands in good favor.

If that answers your question, Mr. Chairman, I would like to have Mr. Walton say a word to you.

PROBLEMS THAT CONFRONT TEXAS.

Mr. WALTON. Mr. Chairman, I simply want to point out very briefly some of the problems we have in Texas, and to speak also for the whole southern group of directors.

If I understand the purpose of the Smith-Lever Act, it was the original intention when it reached its maturity there would be sufficient funds, if the States would offset those Federal funds, to have a county agent for each of the agricultural counties of the United States. We have in Texas 255 counties. We have 165 county agents and 70 or 71 home-demonstration agents, and about 30 negro extension workers who are local assistants to the county agents. That leaves a considerable number of Texas counties in which we do not have sufficient funds to meet the appropriations of the local boards of county commissioners to provide agents where they are actually

needed and where there is a demand for them. I think that the same situation applies, perhaps, in other Southern States in about the same percentage on the basis of the counties that we have in Texas.

I think also there is a growing demand—I know it is true in Texas—on the part of the people of the counties for assistance from the department in establishing these agents to render service to the homes of the counties. I know that demand has increased substantially in our State in the last 12 months. We are having now more requests for the establishment of the county home-demonstration work in the counties on the part of the local people, without any effort at all on the part of the institution, than we have ever had.

ECONOMIC SITUATION OF FARMER IN SOUTH.

Moreover, the agricultural situation in many respects in the South, the economic situation of the farmer, is a very depressing one. Of the 1,500,000 women who work in the fields of the United States, about 1,250,000 work in the cotton fields of the South. Somebody says that is largely a problem of the southern negro. I am a southerner and have all the prejudices and opinions of the average Texan on that question, but that is a substantial part of our agricultural citizenry, and any work we may do in rural places that helps to improve that situation certainly helps to raise the standard of the whole citizenship of our section.

Regardless of what the intent of the Congress might have been or those responsible for the appropriation of the supplemental fund hretofore as to its permanency or as to its being a temporary fund, there is no doubt that we are faced with situations now that could not have been contemplated or known by those who were responsible for the passage of the Smith-Lever Act in its original form. Conditions have come about that make it inadequate to meet the situation if we are to put county workers with a properly balanced extension staff in all the agricultural counties of the United States. That is certainly true in Texas, and I think it is true the country over.

VALUE OF EXTENSION WORK TO FARMERS.

I understand it is not necessary to argue with this committee on the importance of the service these people render. I am sure you gentlemen realize that the farmers' situation now is perhaps as unsatisfactory as it has been at any time for a decade or more, and I believe this service offers the best opportunity of rendering constructive service to the agricultural people, and that it is a service that helps to make the whole situation on the farms very much better.

That is all I care to say unless there are some questions you care to ask about the situation in the South.

Mr. ANDERSON. Is there anything further, Mr. Christie?

Mr. CHRISTIE. I do not believe we should take much more of your time. We want to emphasize the fact that in the 2,800 counties in the United States we have agents in about 2,100 of them. We might agree that we do not need agents in all of these, but we do know it to be a fact that a large number of counties not yet organized must have help if we are going to carry out the program which has been

set before us. This whole question has been carefully considered by the Secretary of Agriculture and his colleagues in the department, and it has been carefully considered by the agricultural colleagues and by the county people, and we feel that there is a need for an appropriation of \$1,500,000 this year. The work will be benefited by receiving that money, while, on the other hand, if the appropriation is cut the work is going to be seriously hampered. In view of the great demands of agriculture I am sincerely hoping that this cut in the appropriation will not be made, but that you will give us the full amount.

Mr. ANDERSON. Of course, this is the first year when there has been any reduction of the total fund available, is it not?

Mr. CHRISTIE. Yes. Last year the funds were redistributed on the basis of the last census. The result was that in Indiana we went down on our percentage of rural population, and therefore we got a less amount from the Smith-Lever fund and the supplemental fund, making the total amount received from both funds a few hundred dollars less than the previous year, even though the Smith-Lever fund had increased.

Mr. ANDERSON. The converse might be true in other places.

Mr. CHRISTIE. That is true. When you take States like Ohio, Indiana, Iowa, and Illinois, some of the big States that are contributing in a large way to the agricultural products of the country, we have received for this year but little more money than we received the year before. So if any cut is made in the supplemental funds the work will be seriously impaired. If the supplemental fund is placed at \$1,500,000, these States will receive practically the same amount of money they had last year. In some of the Western States they have received a little more money, but they need it. They have been getting a few hundred dollars out of the supplemental fund because of the small rural population, and yet they have a tremendous problem in their development work, which is making for better agriculture in the country. We are not complaining because they have gotten that money. We hope they can get more. They should have all possible consideration.

STATEMENT OF MR. D. M. GREEN, OF THE EXHIBIT SECTION.

AGRICULTURAL EXHIBITS AT FAIRS.

Mr. ANDERSON. The next item is on page 33, to enable the Secretary of Agriculture to make suitable agricultural exhibits at State, interstate, and international fairs held within the United States, for which you have estimated \$85,080.

Mr. GREEN. I have here a list of all the places at which exhibits were made during the fiscal year 1922.

FAIRS AT WHICH EXHIBITS WERE MADE DURING FISCAL YEAR 1923.

Billings, Mont., Midland Empire Fair, September 19 to 22.
 Birmingham, Ala., Alabama State Fair, October 2 to 7.
 Boise, Idaho, Idaho State Fair, September 25 to 30.
 Brockton, Mass., Brockton Fair, October 3 to 7.
 Chehalis, Wash., Southwest Washington Fair, August 28 to September 2.
 Chicago, Ill., Pageant of Progress, July 29 to August 20.
 Chicago, Ill., International Live Stock Exposition (floor space 8,748 square feet), December 2 to 9.

Cleveland, Oh'., Association of Ice Cream Supply Men, October 17 to 21.
 Columbia, S. C., South Carolina State Fair, October 23 to 28.
 Danville, Ill., Illinois and Indiana Fair, August 27 to September 2.
 Detroit, Mich., Michigan State Fair, September 3 to 10.
 Douglas, Wyo., Wyoming Free State Fair, September 12 to 15.
 Elko, Nev., Elko Fair, September 15 to 17.
 Erie, Pa., Erie's Big Exposition, August 21 to 26.
 Frederick, Md., Frederick Fair, October 17 to 20.
 Fresno, Calif., Fresno District Fair, September 25 to 30.
 Grand Forks, N. Dak., the Grand Forks Fair, July 24 to 29.
 Hagerstown, Md., the Hagerstown Fair, October 10 to 14.
 Helena, Mont., Montana State Fair, September 25 to 30.
 Honolulu, Hawaii, Pan-American Commercial Conference, October 25 to 31.
 Huron, S. Dak., South Dakota State Fair, September 11 to 15.
 Jacksonville, Fla., Florida State Fair and Exposition, November 17 to 25.
 Kansas City, Mo., Heart of America Dairy Show, June 5 to 10.
 Kansas City, Mo., American Royal Live Stock Show, November 18 to 15.
 Lewiston, Idaho, Northwest Live Stock Show, September 12 to 16.
 Little Rock, Ark., Arkansas State Fair, October 9 to 15.
 Mandan, N. Dak., Missouri Slope Agricultural & Fair Association, August 29 to 31.
 Memphis, Tenn., Memphis Tri-State Fair, September 23 to 30.
 Meridian, Miss., Mississippi-Alabama Fair, October 9 to 14.
 Milwaukee, Wis., Wisconsin State Fair, August 28 to September 2.
 Muskogee, Okla., Oklahoma Free State Fair, October 2 to 7.
 Omaha, Nebr., Ak-Sar-Ben Fall Festival, September 12 to 23.
 Phoenix, Ariz., Arizona Fair, October 30 to November 4.
 Portland, Oreg., Pacific International Live Stock Exposition, November 4 to 11.
 Prescott, Ariz., North Arizona State Fair, October 19 to 21.
 Pueblo, Colo., Colorado State Fair, September 25 to 30.
 Puyallup, Wash., Western Washington Fair, October 2 to 7.
 Raton, N. Mex., Northern New Mexico Fair, September 12 to 15.
 Riverside, Calif., Southern California Fair, October 10 to 15.
 Rochester, N. Y., Rochester Exposition, September 4 to 9.
 Rome, Ga., Rome County Fair, October 3 to 7.
 Sacramento, Calif., California State Fair, September 2 to 10.
 Salem, Oreg., Oregon State Fair, September 25 to 30.
 Salt Lake City, Utah, Utah State Fair, October 2 to 7.
 Savannah, Ga., Savannah Tri-State Exposition, October 23 to 28.
 Sioux City, Iowa, Interstate Fair, September 17 to 23.
 Spokane, Wash., Spokane Interstate Fair, September 4 to 9.
 Springfield, Mass., Eastern States Exposition, September 17 to 23.
 St. Paul, Minn., National Dairy Exposition (floor space 6,534 square feet).
 October 7 to 14.
 Stuttgart, Ark., Arkansas Rice Carnival, November 15 to 17.
 Tampa, Fla., South Florida Fair, February 1 to 10.
 Timonium, Md., Maryland State Fair, September 4 to 9.
 Toledo, Ohio, National Farmers' Exposition, December 7 to 15.
 Topeka, Kans., the Kansas Free Fair, September 11 to 16.
 Trenton, N. J., Trenton Fair, September 26 to 30.
 Waco, Tex., Texas Cotton Palace, October 21 to November 5.
 Waterloo, Iowa, Dairy Cattle Congress, September 25 to October 1.
 Wheeling, W. Va., West Virginia State Fair, September 4 to 9.
 Worcester, Mass., New England Fair, September 2 to 6.
 Yakima, Wash., Washington State Fair, September 18 to 23.
 Total number of showing points, 60.

Mr. ANDERSON. How many are there?

Mr. GREEN. Sixty.

Mr. ANDERSON. Just have them included in the record. That will be sufficient. Were these all large shows?

Mr. GREEN. Yes, sir; but most of them were State fairs. There were several special shows like the International Live-stock Exposi-

tion and the National Dairy Exposition, but the majority of them were State fairs.

Mr. ANDERSON. This appropriation apparently carries an increase of \$15,080. You had better give us some reason for that.

Mr. GREEN. The \$15,080, as it appears in the estimate, while apparently an increase is actually not so. The \$10,080 is the exhibits portion of the appropriation "General expenses Division of Publications—extra labor roll," while \$5,000 of the amount represents two statutory positions—one at \$2,000 and one at \$3,000. These items added together give \$15,080, but make no actual increase over the 1923 appropriation.

Mr. ANDERSON. Are you planning to make any exhibit at the National Dairy Show next year?

Mr. GREEN. Yes, sir; but just what it will be next year has not been determined. It may vary somewhat in type and design from this year's exhibit at St. Paul, but that will be decided later. As Mr. Pugsley previously mentioned, however, we could not build any larger exhibit than the one at this year's National Dairy Show without using more funds and if these were taken from our present appropriation it would seriously hamper the exhibit work at other points.

PROBABLE COST INTERNATIONAL LIVE-STOCK EXHIBIT.

Mr. ANDERSON. What amount of the appropriation was expended for the National Dairy Show this year?

Mr. GREEN. Do you mean by that the total cost in making the exhibit?

Mr. ANDERSON. Yes; at the dairy show.

Mr. GREEN. Approximately \$10,000. That includes the mechanical construction of the exhibit and salary of the people during the time it was being built.

Mr. ANDERSON. Do you think an exhibit which would adequately represent the dairy industry of the United States at an international dairy show could be made for \$10,000?

Mr. GREEN. No, sir; I do not.

Mr. ANDERSON. Will you tell us what it could be made for?

Mr. GREEN. Perhaps \$15,000, but that would depend upon the definition given "adequate." I do not know how much of an exhibit Mr. Skinner has in mind. I do not think it could be built for less.

Mr. ANDERSON. Well, I have a feeling that when we have invited these people over here we ought to give them something for their money. The exhibit ought to be one that would reflect credit not only upon the industry but upon the United States. I would not feel myself like with holding \$5,000 or \$10,000 on a proposition of that kind if it meant an adequate exhibit rather than an inadequate one to picture the industry of the United States.

Mr. GREEN. I do not believe \$15,000 would build such an exhibit as you refer to or one that would be in keeping with other things that I understand they will have here at this world's congress. I would say that such an exhibit would cost \$25,000,000, because the exhibit we put on at the National Dairy Show this year cost us between \$10,000 and \$11,000, and I do not think that is exactly what they want.

Mr. ANDERSON. I saw that. I think it was very good for its kind, but I do not think that is what they want. I would not think that it would be in keeping with a show in our own country where we invite competition from all the other great countries of the world.

Mr. JUMP. You will remember the past history on this appropriation, Mr. Chairman. You will recall that when the amount was \$100,000, which is the way they started out with this when it was handled by the other committee, there was a proviso in it that \$25,000 should be available for the National Dairy Show. That year, as I recall it, the department spent about \$23,000 on the dairy-show exhibit. It was next to the last year the show was held in Chicago. The next year the department requested not to tie up all that money in one show, and the cost of the department's exhibit was reduced to \$10,000. I am under the impression that this year's and last year's exhibit cost even a little under that amount. I presume what you have in mind now would be an exhibit showing modern dairy methods and perhaps some of the laboratory work, like the making of cheese and such as that, and that is where the money comes in, where you set up those temporary laboratories at shows like we had last year at St. Paul, and the year before at Chicago. Did you see the show at St. Paul last year, which included the small bacteriological laboratory?

Mr. ANDERSON. No, sir.

Mr. GREEN. Dairy machinery, laboratory, and similar equipment is very expensive.

Mr. BUCHANAN. Somebody ought to be able to tell us what it would cost to put on a creditable exhibit at this world's congress.

Mr. GREEN. It will cost \$25,000.

Mr. ANDERSON. You cut out this language "in connection with the other departments of the Government." That is for show purposes?

Mr. GREEN. Yes, sir.

Mr. BUCHANAN. You never cooperate with any other department?

Mr. GREEN. Our showings are almost entirely of an agricultural nature.

Mr. JUMP. We could still cooperate with other departments if this language were cut out, and would do so wherever economical or advantageous. I never did know why that proviso was put in there.

REASONS FOR DESIRING TO HAVE APPROPRIATION AVAILABLE FOR EMPLOYMENT OF ASSISTANCE IN DISTRICT OF COLUMBIA.

Mr. ANDERSON. You propose to cut out the language "And the payment of rents" and insert in lieu thereof "in or outside the city of Washington." What is the object of that?

Mr. GREEN. Because the work has been considerably hampered by having part of our work done outside of the District of Columbia and the other part here. We have our arts rooms and warehouse in Alexandria and our offices in Washington, and it means going back and forth with sketches and supplies, hauling material, and taking people back and forth there who wish to inspect the work.

Mr. ANDERSON. As the language now stands you can not pay for rental in the District?

Mr. GREEN. No; we can not pay rental or salaries in the District.

Mr. JUMP. You can use the small portion, about \$11,000, on the extra labor roll for salaries, but you can not use the exhibit fund proper, consequently the work has to be done at Alexandria. We want to get the work done here in some of these temporary buildings, if we can. If we can not do that, we will go on at Alexandria.

GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. The next item is on page 35, for general administrative expenses connected with the lines of work of the States Relations Service, including the offices of the director and the chief clerk. You propose to cut out the language which relates to the lines of work of the States Relations Service, including the offices of the director, the chief clerk, the offices in charge of publication, library, accounts, supplies, and ———, and insert "extension service" in lieu thereof?

Mr. ALLEN. Yes, sir.

Mr. ANDERSON. There is no change in the amount here?

Mr. ALLEN. No, sir.

FRIDAY, NOVEMBER 16, 1922.

STATEMENT OF MR. W. E. SKINNER, REPRESENTING NATIONAL DAIRY ASSOCIATION.

AGRICULTURAL EXHIBITS INTERNATIONAL LIVE-STOCK EXPOSITION.

Mr. ANDERSON. We will hear Mr. Skinner. You represent whom?

Mr. SKINNER. The National Dairy Association.

Mr. ANDERSON. The committee will take up this morning the item on page 33, to enable the Secretary of Agriculture to make suitable agricultural exhibits at State, interstate, and international fairs held within the United States, etc. The estimate calls for \$85,080, as compared with \$70,000 last year.

Mr. SKINNER. Our interest in this thing this year more than any other, Mr. Chairman, is that in 1923 the Congress of the United States requested the President to invite in 1923 the dairy interests of the world to assemble here for a world's dairy congress. And at that time we purpose making our national show international in character, so as to encompass the world's industry, and we are very keenly concerned over the presentation of the industry to be made by the Department of Agriculture, that it be sufficiently impressive to carry a message of significance to these people with reference to our size and importance and as to our ability to resist any intrusions while we are developing our own industry. So that I am seeking a larger exhibit, and perhaps one that will carry to some extent a different character of message than that delivered this year at our show in Minnesota, and we are urging upon the department the necessity for going into greater detail so as to enhance the value of our exhibit to our own consuming population as well as the producing interests in other sections of the country than that occupied by the show the last two years.

Therefore, I am very desirous that the full amount of this appropriation goes through for that purpose.

Mr. ANDERSON. You are not asking for an added sum above that estimated by the department?

Mr. SKINNER. \$85,000, without any reduction, will probably take care of this work.

Mr. BUCHANAN. You say the President invited the dairy interests?

Mr. SKINNER. Yes, sir.

Mr. BUCHANAN. Have we extended that invitation yet?

Mr. SKINNER. Yes, sir.

Mr. BUCHANAN. Has it been accepted?

Mr. SKINNER. Yes, sir.

Mr. ANDERSON. Has the date been set for the show?

Mr. SKINNER. Our date is fixed in our by-laws at the same time this year as last—October 6 to 13, in 1923.

Mr. ANDERSON. Has the place been selected yet?

Mr. SKINNER. Not yet, sir, no; I am on a tour of inspection now of several cities.

Mr. ANDERSON. By whom is the place selected?

Mr. SKINNER. By the board of directors of the United States association.

Mr. BUCHANAN. There is \$15,000 extra that you want to add to these exhibits?

Mr. SKINNER. I did not know that there was anything extra.

Mr. BUCHANAN. I mean over the other appropriation the preceding year.

Mr. SKINNER. Over the other appropriation; yes.

Mr. BUCHANAN. How is the appropriation this year? Have you any unexpected balance, or are you going to have any?

Mr. SKINNER. That I do not know, sir,

Mr. JUMP. Mr. Chairman, the increase in the exhibits item from \$70,000 to \$85,000 is an apparent increase only. The reason for that is that the \$15,080 is from the extra labor roll of the Division of Publications and several statutory places from the roll of the same division, and that is how you get the \$85,000 figure this year. It does not represent any increase. It just brings together all of the money for exhibits at fairs, etc.

Mr. SKINNER. Will this give us, then, what we want?

Mr. JUMP. That is something I am not able to answer. Mr. Pugsley and Mr. Green have more to do with the exhibits. I do not know what extra exhibits you require, and how much they would cost. The way the estimates stand now the amount passed by the Bureau of the Budget is just the same as the amount this year. If they would have to have more money than they have this year, that is something that Mr. Green and Mr. Pugsley should consider.

Assistant Secretary PUGSLEY. I think that could be answered best in this way, that there can be no increase in the amount of money put into dairy interests this year if the appropriation is the same as last year, unless some other exhibit work is lessened in quantity or quality. In other words, if the money is provided as last year, there will be about as much put into the dairy exhibit next year as this. But there can be no increase unless some other exhibit is robbed, if the appropriation is the same.

Mr. SKINNER. May I ask, then, to have some other exhibit robbed? In other words, I want to make sure about this.

Mr. ANDERSON. That \$15,000, I understand, represents, as Mr. Jump states, a transfer of another item into this item. So it does not represent an actual increase in the sum available for this purpose this year. We will go into the adequacy of the amount, Mr. Skinner, when we get these gentlemen up here, and find out about it.

WEATHER BUREAU.

STATEMENTS OF PROF. C. F. MARVIN, CHIEF OF BUREAU; MESSRS. J. WARREN SMITH AND W. R. GREGG, METEOROLOGISTS OF WEATHER BUREAU.

GENERAL STATEMENT OF WORK.

Mr. ANDERSON. The next item is on page 37, Weather Bureau.

Mr. MARVIN. Mr. Anderson, I think the committee understands already very fully the nature of the work of the Weather Bureau, that it is chiefly a program of daily service to the people in the collections of observations and furnishing daily forecasts in regard to the weather. We think there is a great economic benefit in that service and I would like to read a couple of letters here, very short ones, in support of that. This is a letter from the Broadway Market Co., Detroit, Mich., to the local official in charge of this work, Mr. Norman B. Conger, and reads as follows:

NORMAN B. CONGER,
Chief of United States Weather Bureau,
1314 Majestic Building, City.

MY DEAR MR. CONGER: I want to personally, also in behalf of the Broadway Market Co., thank you very much for the information regarding weather conditions recently given us by you while installing a new roof on our building.

The information as given us by you each day governed our daily work of removing the old roof and installing the new. It was worth real dollars and cents to us and we wish to express our thanks to you personally for it.

Very truly yours,

THE BROADWAY MARKET,
R. S. WHITE,
General Manager.

That expression, "was worth real dollars and cents to us," is a good thing. We are performing that sort of service every day all over the United States. This other letter is significant, also. This is from the Standard Oil Co., New York City, dated October 27, 1922, addressed to the Chief of the Weather Bureau, and is as follows:

Mr. CHARLES F. MARVIN,
Chief United States Weather Bureau,
Washington, D. C.

DEAR SIR: During the hurricane in the Yucatan Channel and Gulf of Mexico last week a number of our steamers were in close proximity to the center of this disturbance.

Due largely to the accurate and prompt information which we received daily from your office and Mr. Kimball, of your New York office, we were able to keep the masters of our vessels fully advised of the course this storm was

taking, thus enabling them to keep clear of the center of the storm and perhaps saving the loss of both life and property.

We wish to take this opportunity of expressing to you our thanks for the valued services rendered, which are greatly appreciated.

Yours very truly,

STANDARD OIL CO. (NEW JERSEY),
MARINE DEPARTMENT,
ROBERT L. HAGUE, *Manager*.

That is an illustration of the real benefits that come from our daily work, and every dollar of money in our appropriation, I feel, is productive of immediate economic benefit day after day.

I have prepared a written statement here showing some of the work of the bureau, which I would like to have placed in the record, if you please.

MR. ANDERSON. Without objection, it goes into the record.

BRIEF STATEMENT OF WORK AND SERVICE OF THE UNITED STATES WEATHER BUREAU.

The daily program of work of the Weather Bureau comprises a very far-reaching service of direct and immediate practical and economic benefit to all the people and all the activities of the Nation. This work is based on weather observations taken simultaneously and twice daily at about 200 stations in the United States, so placed geographically as to cover all sections of the country, and from points in Canada, the West Indies, Mexico, Central America, Alaska, Hawaiian Islands, Bermuda, Europe, the Far East, and a few other points in the Northern Hemisphere. The reports are received by telegraph, by telephone, and by radio, and are charted at the district forecast centers which are located at Washington, Chicago, New Orleans, Denver, and San Francisco. The forecasts and warnings are deduced therefrom and are immediately disseminated. The time consumed between the taking of the observations and the issuing of the forecasts and warnings is about one and one-half hours. Every reasonable means is utilized to the utmost to secure the immediate and complete dissemination of forecasts, warnings, and advices of all kinds.

TOPICAL LIST OF MORE IMPORTANT SERVICES.

- (a) Daily forecasts and weekly outlook.
- (b) Shippers' forecasts.
- (c) Warnings of floods and advices as to stages of important rivers.
- (d) Storm and hurricane warnings.
- (e) Cold-wave warnings.
- (f) Frost warnings for protection of orchards and other crops.
- (g) Fruit spray and harvest weather advices.
- (h) Cotton and corn and wheat region service.
- (i) Cattle region service.
- (j) Weekly weather and crop bulletin.
- (k) Fire weather warning for protection of forests.
- (l) Research and investigations.

The foregoing services are briefly described in what follows:

(a) *Daily forecasts and weekly outlook.*—Forecasts, covering periods of 36 to 48 hours in advance, are issued twice daily, 8 a. m. and 8 p. m., seventy-fifth meridian time, and are telegraphed to about 1,600 distributing points and thence further disseminated by telegraph, telephone, radio, and mail to several thousand cities, towns, and communities. They are furnished also to press associations and to newspapers, and are published in practically every daily newspaper in the United States. Printed maps and bulletins containing weather reports and forecasts are mailed or delivered to commercial, marine, agricultural, industrial, and educational institutions in less than three hours after the observations are taken. The manifold uses to which the weather forecasts and information are applied are impracticable of enumeration. The life and activity of the whole population are affected by the weather and receive more or less benefit therefrom.

A Weekly Outlook is issued each Saturday for the six days beginning with the ensuing Monday, and covers the entire United States, which is divided for the purpose into nine zones. The forecasts necessarily are couched in general

terms. They are telegraphed to designated centers, whereas they are further disseminated by telegraph, telephone, and mail and are published in Sunday and Monday papers. These outlooks originally were intended more particularly for agricultural interests but their value was soon recognized by manufacturers, railroads, shippers, and other commercial interests and are extensively used by them.

(b) *Shippers' forecasts.*—Forecasts of minimum temperatures expected within the next 24 to 36 hours are made daily during the winter months by officials in charge of stations located in commercial centers for the guidance of shippers of perishable products. They are also issued from time to time as occasion demands during the summer months whenever temperatures in excess of 90° are expected. Shipments of perishable products are regulated by these forecasts to a large degree, and the savings in loss of foodstuffs and in claims for damages in transit amount to several million dollars annually in such shipping centers as New York, Chicago, and Philadelphia.

(c) *Warnings of floods and reports of river stages.*—The river and flood service of the bureau supplies warnings of oncoming floods and dangerous high water and also gives advices of river stages for navigation and other purposes at times ordinary conditions prevail. In the far West snow measurements and surveys give useful advices concerning summer water supply for stream-flow irrigation, etc.

The flood warnings of the Weather Bureau have resulted in the saving of thousands of lives and millions of dollars worth of property. During the great flood of the last spring in the Mississippi River very accurate warnings were given from one to four weeks in advance. It is estimated that the value of property saved by Weather Bureau flood warnings during this one flood was about \$8,000,000. The total losses as reported was about \$17,000,000, or the Weather Bureau warnings decreased the possible loss by approximately 30 per cent.

The following acknowledgments of the efficiency of our flood warnings indicate the public regard in which they are held:

From Davenport, Iowa, Times, of April 26, 1922:

"The Weather Bureau employees stationed in the territory from which data come on which to base forecasts of the extent of floods along the Mississippi River are to be congratulated upon the precision with which they foretold the extent of the rise of the river in the last 10 days. Considering the large volume of water at sweeps southward in the channel of the mighty Mississippi, the precision of these forecasts is worthy of commendation as evidence of efficiency and cooperation on the part of all employees of the Weather Bureau."

From the New York Herald of April 29, 1922:

"What is to be done with the Mississippi is one of the enduring problems of the South. The work of the Federal Weather Bureau in forecasting the water stage at various points between Cairo and New Orleans is helpful, as it gives warning when the peak may be expected. The degree of accuracy attained by the bureau is remarkable. For example, between 42.5 and 43 feet was forecast for Memphis by the end of March. On March 31 and April 1 the stage was 42.6 feet."

From H. M. Cassels, Ellenton, S. C., on the Savannah River:

"You can not imagine how much value your efforts to keep all of us posted relative to river conditions has been worth to all of us. On several occasions I personally know where it has saved thousands of dollars worth of timber and stock."

From the Moline Plow Co., Illinois:

"We wish to thank you for the cooperation given us during the recent high waters here in the Tricities. We appreciate very much the service rendered, and it is really impossible to estimate the savings in damaged stock that we were able to protect due to warnings issued by your department."

(d) *Storm and hurricane warnings.*—Shipping interests on the Atlantic, Pacific, and Gulf coasts and the waters adjacent thereto and on the Great Lakes are always fully warned of the approach of storms dangerous to shipping. A special service is conducted for the purpose of giving warnings of hurricanes to the coast regions of the South Atlantic and the Gulf of Mexico and to ships in adjacent waters and in the Caribbean Sea. These advices are an important factor in the navigating of a great many ships engaged in ocean and lake traffic. Warnings of a single hurricane are known to have detained in port vessels, including their cargoes, valued at over \$30,000,000. With the wonderful protection afforded by radio communication, ships at sea are now constantly aware

of storm conditions before them, and many instances like the letter from the Standard Oil Co. can be cited of the great economic benefits resulting from the hurricane warning service of the bureau.

(e) *Cold-wave warnings.*—Sudden and damaging low temperatures which frequently occur and sweep across this country during the winter season have acquired the name of cold waves and blizzards. Forecasts of such are issued from 24 to 36 hours in advance and are disseminated throughout the threatened regions by means of flag displays, by telegraph, telephone, radio, and mail. These warnings are valuable especially to railroads in the making up of trains and in the maintenance of schedules, to shippers of perishable goods, public utilities, stock raisers, citrus fruit growers, florists, and other innumerable business interests.

(f) *Frost warnings for protection of orchards and other crops.*—Whenever conditions indicate the occurrence of damaging frosts, detailed and specific warnings and advices are disseminated by the bureau to all localities affected, where growers are prepared to protect their crops by the various means in vogue. In many instances industries would be too hazardous to be profitable without the Weather Bureau warnings. This is true especially of early trucking in the South Atlantic and Gulf States and of citrus fruit production in sections of the Pacific coast. This work has become so important in the latter districts that a trained meteorologist is assigned for a few weeks to certain localities during the danger season to give warnings of the minimum temperature during the night and advise as to the extent protective measures must be taken. The frost warnings also serve for the protection of sugar cane, alfalfa seed crops, home gardens, flower beds, etc. Alfalfa seeds are very susceptible to damage, and frosts are frequent about the time the crop is maturing. It is estimated that the crop increases in value at the rate of about \$5 an acre each 24 hours during the harvesting period; if cut too early, much loss is sustained, but heavier losses may occur from frost if not cut soon enough. The growers depend on the Weather Bureau in keeping them advised and vigorously push harvesting operations when a warning is received.

In the efficient prosecution of the fruit frost work extensive temperature surveys in the principal citrus and deciduous fruit districts of the West, particularly in Arizona, California, Oregon, and Washington, are being made, in cooperation with organizations of fruit growers, as an aid in frost protection. Severe freezes occurred in the citrus districts of southern California during the winter of 1921-22, which resulted in great loss to fruit growers, but damage would have been much greater had it not been for the special service rendered by the Weather Bureau.

In regions where frost protective methods have been most fully developed and where growers are best organized to profit by the Weather Bureau service, the work is held in very high esteem, and local organizations not only write us many flattering and commendatory letters but are ready to put up the money of their organization to carry the work beyond that possible from the limited funds of the Weather Bureau. For example, the fruit growers of southern California, wishing a more extensive temperature survey and frost service during the present winter than the available funds of the bureau permit have made a sum in excess of \$8,000 available for cooperative work with the bureau, which in fact more than equals the expenditures in the same locality from Government funds.

To remove any doubt as to the real economic benefits of the fruit frost service of the Weather Bureau a few quotations may be given from letters from the citrus growers and organizations who depend upon this service.

Letter by Mr. H. E. Walcott, secretary of the Pomona (Calif.) Fruit Growers' Exchange, dated January 31, 1922:

"We find in the district covered by the Pomona (Weather Bureau) stations that there are approximately 7,000 acres equipped for firing and making use of your forecasts. The value of the crop in this acreage is fully \$2,800,000. There are within this same territory about 9,000 acres not prepared to protect against frost. The crop in the unprotected acreage is practically a total loss, besides severe injury to the trees over a large proportion of this unprotected acreage.

"The growers having equipment and using your service burned about 1,380,000 gallons of oil, and we consider the information you have furnished has prevented unnecessary burning of a much larger quantity.

"We feel that the investigation of frost prevention being carried on by the Weather Bureau is of great importance, and we hope there will be nothing to interfere with the continuation of the work."

The losses of last season to unprotected fruit in California will undoubtedly result in the equipping of a much larger acreage for frost protection, and the data gathered by the Weather Bureau in its recently inaugurated extensive temperature surveys will be in great demand, and the cooperation by the bureau will unquestionably be responsible for the saving of many millions of dollars worth of fruit. This service, prior to its recent enlargement and extension, is estimated to have effected savings of fruit of a value of \$1,500,000 annually and should be much greater in the future.

(g) *Fruit spray and harvest-weather forecasts.*—To meet urgent requests from progressive horticulturists a special service has been conducted for several seasons in connection with orchard-spraying activities in the apple-growing sections in northern New York and to a more limited extent in localities in Pennsylvania and Virginia. The work has been carried on in cooperation with State extension and county and farm bureau agencies as a demonstration of the practicability and value of forecasts of rain on which the success of the spraying operations largely depend. Damage from frost is not a serious menace to apple growing in northern New York. Serious loss from this cause occurs on an average of less than once in 10 years. Scab, a fungus disease, is the worst enemy. The scab remains dormant as long as the weather is dry. The spores come into activity when moistened, and unless killed by spray the trees may become infected within 24 hours. The problem is to apply the spray just before a rain. When the rains occur the fungi begin to grow and are killed by the poison in the spray. If the spray is applied and the rains do not occur within three days thereafter the effect of the poison is minimized or lost entirely. There are about 12,000 commercial apple growers in seven counties in New York who are equipped for spraying. At least three applications are necessary each season. It is estimated that the total cost of apple-tree spraying for one season in the seven counties is about \$3,500,000. Therefore, accurate and timely forecasts of the coming of rains in the spraying season are of great importance to the orchardists in determining where and when the spray shall be applied. In some of the larger orchards three days are required for one application. Consequently the forecasts must be for a longer period than is covered by the regular forecasts. The work is of a difficult character and requires the special study and attention of experts. The responsibility placed on the Weather Bureau in giving correct information is apparent; if the forecaster fails to predict rain and the spray is not applied, the trees become immediately affected; if rain is forecast and the spray is applied, but the rain fails to materialize, the effect of the spraying is lost entirely or considerably reduced and heavy losses are sustained by the growers.

The following is quoted from a special report on this work during the season of 1922 by Professor Crosby and Professor Horner, of the New York State extension, based on information submitted by field assistants and county agents:

"The special forecasts for the spray service were sent to the following eight counties: Orleans, Monroe, Wayne, Genesee, Onondaga, Chautauqua, and Ulster. They were used constantly by the field assistants in timing their recommendations for sprays. In the case of sprays involving fungus diseases these special forecasts are especially important because it is well known that fungus diseases are vitally affected by the periods of wet weather. Four of the most important counties had a telephone relay system by means of which it was possible to warn the growers quickly when it was time to apply the spray. This system was used throughout the season whenever occasion demanded. At other times and in counties where the relay system was not used circular letters and postcards were used to broadcast the information.

"The number of fruit growers reached directly by this service was 2,500. It is a well-known fact, however, that nearly every grower who received the service has at least one neighbor who gets the information from him. This would nearly double the number benefiting by this service.

"We feel strongly that these special weather forecasts are of great importance in making the Weather Bureau of real service to our fruit growers and general farmers, and that definite provision for the service is essential for getting the full value out of the Weather Bureau."

A service for the special benefit of farmers in the harvesting of hay, wheat, and other crops is conducted in New York State. This work also is of a tentative and experimental character, and its development in New York and its extension to other States will depend on funds being provided therefor. These forecasts are issued for the guidance of farmers in harvesting of crops liable to damage or loss if unfavorable weather occurs between the time of cutting and shocking. The predictions are not for a fixed period, as is the case with the general daily forecasts, but for just as long a period as the forecaster feels that the conditions as shown on the current weather map justifies a reasonable expectation of accuracy. Sometimes this period is only for 24 hours and at others three or four days. The prognostications are worded to apply to the particular purpose and to convey to the farmer the degree of confidence that the forecaster has in his forecasts. Illustrations of these forecasts are: "Conditions excellent for drying weather Wednesday and Thursday; Friday, uncertain," or "Outlook for harvesting next two days uncertain; rain very likely." This work also is conducted in cooperation with county and farm bureau agents, who disseminate the forecasts by telephone to the individual farmers.

(h) *Cotton and corn and wheat region service.*—More than 300 special telegraphic stations are maintained in the principal corn and wheat and cotton growing States for the collection and dissemination, in the form of daily bulletins, of daily weather conditions as affecting the development of these crops. The information is given wide distribution, the annual value to the public being estimated at about \$3,325,000.

(i) *Cattle region service.*—Weekly reports are collected and disseminated, showing the effect of weather conditions on ranges and live stock over the great grazing areas of the West. The estimated value to the public is \$250,000.

(j) *Weekly weather and crop bulletins.*—Weekly summaries of weather conditions and their effect on growing crops and farming operations are collected at the central office and published in the department publication, *Weather, Crops, and Markets*. Similar summaries are issued in the form of weekly bulletins at Chicago, covering the principal corn and wheat region, and at New Orleans for the Cotton Belt, both issued only during the growing season. In addition, weekly summaries are issued at the section center of each State. The estimated value of this service to the public is \$1,500,000.

(k) *Fire weather warnings.*—These warnings are issued whenever conditions indicate hot, dry winds which are favorable to the inception and spread of fires in national forests and other forested regions. They are distributed principally to Forest Service officials and others charged with forest protection, and enable them to assemble crews and apparatus ready for action. The Forest Service, fire wardens, and Forestry Association testify to the great value of these warnings.

Forecasts in aid of aviation.—Weather is an ever present and important factor in successful navigation of the air. A knowledge of existing weather conditions and those to be encountered in flight is essential to aviators in the accomplishment of the journey and in the protection of the life of the flier and the machine he is operating. The Weather Bureau furnishes this information to the fullest extent possible with the funds at its command. Flying weather forecasts of conditions to be expected at flying levels and at the surface are issued twice daily for 14 zones into which the country is divided for this purpose. In addition, more detailed forecasts are made for the three model airways radiating from Washington and having termini at Long Island, Norfolk, and Dayton. Advices also are given directly by telephone and telegraph to individual flyers who desire information personally before beginning flights. Special advices also are supplied in considerable number in connection with aviation meets, transcontinental flights, etc. Aviators are demanding more and more detailed weather information and forecasts, and their demands already are in excess of what the Weather Bureau is able to supply with its present appropriations.

The need for extension of the aerological work of the Weather Bureau is most urgent and should be promptly met. In reality years of time are required before systems of meteorological observations acquire their full value and usefulness in formulating practical benefits to the public. At the present time the number of stations for securing observations in the free air is limited to 6 primary stations and about 14 supplementary stations, which make reports only of pilot balloon flights. These fall greatly to represent the vast

areas covered by even the continental United States, and the present quota of basic reports available to the Weather Bureau is insufficient to safeguard the lives and property of those now engaged in aviation.

The Weather Bureau is the one agency of the Government now prepared to extend and develop this important adjunct to the safe navigation of the air, and in its report to the President submitting fundamental recommendations concerning a national aeronautical policy the National Advisory Committee for Aeronautics makes the following statement:

"When transcontinental airways are established it will be necessary for the Weather Bureau to provide aerological service along such airways as they are established. The committee recommends, therefore, that in the consideration of any future legislation for the encouragement of civil aviation adequate provision of law and appropriation be made for the extension of the aerological work of the Weather Bureau, without which there can be no safety in the air nor success in commercial aviation."

(1) *Research and investigations.*—Forecasting, hydrology, the influence of weather on crops and agricultural operations, climatology and the major phenomena of the circulation of the air are constantly under study by the leaders in the several fields and possibly slow, but none the less steady progress has been made.

The forecasting work of the bureau, especially is at a high stage of efficiency and no great storms or disturbances occur without timely warning to all interests.

Intensive studies of the effect of weather on crops seem to show that the problem is being solved, and that it will be possible to predict the yield per acre of some of the most important crops, based upon a knowledge of the prevailing weather conditions.

In addition to the direct application of free air observations to the needs of aviation special studies and summaries of the data give as nearly complete information as possible of the conditions prevailing at various heights, at different times of the year and under varying conditions of surface winds and weather. During the past year there has been published part 1 of "An Aerological Survey of the United States." In it are giving, by months, seasons, and the year, average and extreme values of pressure, temperature, humidity and wind for all parts of the country east of the Rocky Mountains and for all altitudes up to 5 kilometers (3 miles). Special attention has been given to winds, and these have been classified according to surface directions and their characteristics as to turning with altitude, frequency of different directions and speeds, etc., have been determined and presented in tabular and graphic form. This publication has been adopted by the Army as the standard work on free-air conditions. There is urgent need for extending this survey to the western part of the country where at present there are no upper air observing stations.

During the year there has also been published a report on "Standard atmosphere," based upon the data thus far obtained in this country. This has been officially adopted by the National Advisory Committee for Aeronautics for use in aircraft tests. It forms the basis also for a revision of tables of ballistic density, temperature, etc., now used by the Artillery and Ordnance sections of the Army and Navy.

A study of all available data has been made during the past two or three years with a view to perfecting a method of constructing upper air-pressure maps. This study has progressed to the extent that it is now possible to make such maps for the eastern part of the country. The western part is still unexplored. In so far as the maps are reliable they will be of definite value not only in forecasting for aviation but also in predicting the direction and speed of movement of storms and, therefore, in forecasting surface weather. Their reliability must depend in large part upon additional and more closely distributed data.

SALARIES.

Mr. MARVIN. The statutory roll appears on page 37 and contains no change in appropriation whatever. There is a change of title down about the middle of the page where one skilled mechanic has been added in lieu of an electrician formerly carried in the appro-

priation at \$1,200, which place has been dropped. The mechanic was appointed with the consent of the Civil Service Commission pending approval of this change in title.

Mr. ANDERSON. What becomes of that man?

Mr. MARVIN. What has happened is this: A mechanic was appointed to fill the vacancy of the electrician. He was appointed to a vacancy in the current year.

Mr. ANDERSON. You do not have an electrician as such?

Mr. MARVIN. No, sir. There is no change in the language or amount of appropriations until you come to the bottom of page 39.

Mr. ANDERSON. Necessary expenses in the city of Washington, etc.?

GENERAL EXPENSE.

EXPENSES IN THE CITY OF WASHINGTON.

Mr. MARVIN. There is a change there, an increase amounting to \$3,000. That is one the Director of the Budget authorized in the estimate and is intended to cover the purchase of additional instruments and equipment. We have a stock of instruments and supplies and equipment over the country valued at over \$500,000. The cost of instruments has gone up very much within the last few years, and we have been maintaining these supplies at the bureau for different stations by making a great many repairs and alterations and remodeling old instruments at the bureau. In some cases we are having the work done outside. This material is worn out and no longer capable of being worked over. An increase for the purchase of new supplies was asked, and \$3,000 was granted. That is the only thing in the "In Washington" appropriation.

Mr. ANDERSON. May I ask you one question? The language indicates that that particular item relates entirely to expenditures in the city of Washington. Is that correct?

Mr. MARVIN. Yes, sir.

Mr. ANDERSON. This is separate from your field work?

Mr. MARVIN. Yes, sir.

PRINTING OFFICE.

Mr. ANDERSON. All right.

Mr. MARVIN. The item for printing is for the printing office in the city of Washington. That is a little plant we have at the bureau for printing the maps and other publications which can not be published at the Government Printing Office without too great delay.

Mr. ANDERSON. All right.

Mr. MARVIN. The joint committee has investigated that very thoroughly and approved of it.

EXPENSES OUTSIDE CITY OF WASHINGTON.

The next item is for expenses outside the city of Washington, and carries an increase of \$5,000. I have prepared a chart here which I would like you to look over. Under this field appropriation relating to the work of the bureau in forecasting the weather, etc., we have been carrying a personnel of four or five hundred, and because

of the loss of trained men going abroad during the war we took on more men than than customary, but the number of men has now been reduced to the pre-war level.

NEED OF INCREASED PERSONNEL.

With the growth of the Nation, the work we are performing having increased, we are met with a demand for increase in personnel. The number of men in the field has been kept down to the minimum because of the necessity of keeping the salary amount within the appropriation, and we are also compelled to keep the number down in order to maintain an approach to fair salaries. The Director of the Budget has approved an increase of \$5,000, which will be used in increasing the number of personnel in the field.

Mr. BUCHANAN. Is there any increase of salary in it?

Mr. MARVIN. No, sir. It is an increase in the number of men.

Mr. BUCHANAN. Are you spending the total of the sum of \$359,770 in the other appropriations?

Mr. MARVIN. The figures you cite have reference to the funds for statutory salaries carried in the estimates for 1923. All of that money is never fully expended. Unexpended amounts arise from leave without pay, lapses between termination of appointments and filling of vacancies, and places permanently unfilled, which occasionally arise. During war times, when it was very difficult to keep places filled, amounts of \$15,000 and \$20,000 have been turned back into the Treasury. More than \$3,000 went back in 1922. In the case of this particular appropriation for out of Washington expenses, in addition to the \$710,080 for salaries, \$130,470 for special observations and reports, and \$299,450 for telegraphing and telephoning, there is a balance in the appropriation which provides for miscellaneous expenditures that is not stated in amount, and that balance is inadequate for the purchase of supplies, payment of rentals, and expenses not itemized in the appropriation. We make up the difference out of the surplus in these other funds. The final unexpended balance at the end of the year goes back into the Treasury.

Mr. BUCHANAN. Is that a considerable amount?

Mr. MARVIN. Last year we had a Budget reserve set up which practically set aside in our case a total of \$26,000 and that was exceeded by other unexpended margins that went back into the Treasury. But it meant in those cases withholding the doing of things. Part of that, for example, was withholding inspection of stations in the field. We curtailed the traveling expenses to the minimum. We curtailed the maintenance and repair and painting of buildings, which we own and which need repair. We put repairs off for a year. Wherever we could save anything last year the program was to save it, but in a number of cases the necessity for expenditure carries over into this year. Some service was cut out.

There is always a little uncertainty as to the expenditure for telegraphic communications, because of emergencies arising from unusual storms, etc.

Mr. ANDERSON. How many field stations are you maintaining now?

Mr. MARVIN. We have practically 200 stations, maybe a few more. That is, regular quarters which are owned or rented by the Government and manned by commissioned employees; but we get many reports from other sources than the regular stations.

Mr. ANDERSON. Page 44, next item, for investigations, observations, and reports, forecasts, warnings, and advices for the protection of horticultural interests from frost damage. That appears to have been eliminated. The amount is \$12,000.

FROST WARNING INVESTIGATIONS.

Mr. MARVIN. That is an item which has been omitted to effect economy in Government expenditures. If you desire, we are prepared to show you some features of the work we did with that money last year. Mr. Smith, who has charge of that work, has a few photographs.

PHOTOGRAPHIC ILLUSTRATIONS.

Mr. ANDERSON. Will you tell the committee about these photographs?

Mr. SMITH. Taking them up in their order, No. 1 was taken February 16, 1922. It shows lemon trees in a large grove near Whittier, Calif., being removed because of damage by frosts of January 19-26, 1922. Some cracks in trunks and large branches of trees can be seen in the photograph.

Mr. ANDERSON. Could that have been prevented?

Mr. SMITH. This question is answered by photograph No. 3, which shows a navel orange grove, near Riverside, Calif., indicating the excellent condition of trees and fruit which were protected with 40 7-gallon high stack oil heaters to the acre. The entire crop of oranges from this orchard was graded "Sunkist," a grade which must show practically no frost damage.

No. 5 indicates the damage done directly across the road from the grove shown in No. 3. Practically the entire crop is on the ground and all fruit shows frost injury. That orchard was not protected.

No. 7. Date, January 26, 1922: View in orange grove near Pomona, Calif. Only outside fruit, on outside, or border rows, or trees, show any damage from frost. Trees protected with 50 tall-stack heaters. 5 to 9 gallon capacity, to the acre. Temperature at check station was 18° for one hour on one cold night. Fruit graded 4.5 per cent loss by freezing in portion of grove where temperature records were kept. The work of firing the heaters was very poorly done, and there is no doubt there would have been no damage whatever if the work had been efficiently carried on.

No. 8. Date, January 26, 1922: View in same grove as No. 7, showing excellent condition of trees after freeze. Burning reservoir of heaters is of cast iron; 9-gallon capacity allows long burning time, which is an important point in such cold periods as during the winter of 1921-22, when dangerous temperatures continued for 12 hours and even longer.

Nos. 10 and 11 show the difference between heated and unheated groves. No. 10 shows clusters of orange blossoms, fresh and unin-

jured, following the freeze of January 19 to 23, 1922. The other was just across from there, No. 11; no fruit was picked from the grove on account of frost injury. The grove was not protected by heaters.

DAMAGE TO TREES FROM HEAVY FROSTS.

Mr. ANDERSON. Are these frosts heavy enough to damage the trees?

Mr. SMITH. Not ordinarily, but every few years hard freezes will destroy a whole grove of trees. However, the majority of times they only damage the fruit.

No. 22 shows a great deal of frost damage. Many hundreds of acres of oranges were in this condition. No. 24 shows the effect of freeze.

Nos. 26 and 27 show the oranges damaged near Ontario, Calif. The team at the left in dumping a fresh load. This cull fruit is from a relatively small percentage of groves in this section where any picking whatever was done. In most of the groves no fruit was picked, as an examination showed the loss at 100 per cent.

Mr. ANDERSON. This picture, I take it, means the fruit that was spoiled out of that picked from the trees?

Mr. SMITH. No. They gathered it off the ground and hauled it off, because they did not want to leave it on the ground for the effect it would have upon the soil.

Nos. 31 and 32: No. 31 shows the slitting of bark because of the frost damage, and 32 is a grove across the road close to the other where it was protected by heaters and was in good condition.

PRACTICAL USES OF HEATING STACK.

Mr. BUCHANAN. This is not the heating stack up there, is it?

Mr. SMITH. Yes. Those photographs show conclusively that heating is practical and will save the fruit, and the value of the Weather Bureau's work comes in in temperature surveys which can be made, showing the good that heating can do under these conditions.

Mr. ANDERSON. How much territory can you cover with \$12,000?

Mr. SMITH. Do you mean in acreage or heating?

Mr. ANDERSON. I mean in your general way. How expensive is the protection you would get?

AMOUNT OF TERRITORY COVERED.

Mr. SMITH. In the particular territory last year there was something like 7,000 acres equipped and protected with heaters. Something like 9,000 were not equipped. Of course, all those that were equipped with heaters got the warning from the Weather Bureau. We had in there last year three special field agents, who had special instruments for surveying temperature and who were able to advise the growers, and we only had \$9,000 appropriated last year. In addition to those three men there, they went up to Oregon and Washington in the spring season, and we had several others in smaller sections of the country. I do not have in mind how much money was spent in California to cover those 7,000 acres, but it was not any considerable part of \$9,000.

Mr. MARVIN. This \$12,000 does not cover sufficiently districts in southern California to satisfy the enthusiasm of those people down there, and they are willing to put almost an equal amount to cooperate with us in extending the work to other districts.

Mr. ANDERSON. I suppose these people, when they have these heaters, get the weather report before the frost as well as they can, do they not?

Mr. MARVIN. Yes, sir.

Mr. BUCHANAN. Can not they get it without the instrument?

Mr. MARVIN. They can get the general forecast. They can not get the minimum-temperature forecast until they have men who are capable of making that survey.

Mr. ANDERSON. You say temperature survey. Does that have to be made every year?

Mr. MARVIN. It has to be made sufficiently long to study the conditions, and there must be a man on the ground with special training to make minimum-temperature forecasts.

Mr. BUCHANAN. Each year?

Mr. MARVIN. Yes, sir.

Mr. BUCHANAN. You have made surveys in this section, I presume, in which you have saved the fruit?

Mr. MARVIN. Yes, sir; surveys from which minimum-temperature forecasts have resulted in the saving of fruit.

Mr. BUCHANAN. Is it required that a man be kept there each year to take the temperature or to get any information with reference to those surveys already made to tell when the frost is coming?

Mr. MARVIN. The forecaster must have a knowledge of the current temperatures reported from the orchards in order to advise about starting fires.

Mr. BUCHANAN. Current temperature each day?

Mr. MARVIN. Yes, sir; whether he must be in that office or not is another question.

Mr. BUCHANAN. I mean did he have to be in that State or that community to take the current temperature each day?

Mr. MARVIN. That is necessary, Mr. Buchanan. The Weather Bureau man must be there to interpret the general information he gets in the form of current temperatures from all the orchards.

Mr. BUCHANAN. There is nothing to keep these gentlemen in this fruit business from employing a man and in that way cooperate with you is there?

Mr. MARVIN. I feel that would be a very unsuccessful method of carrying it out. You might say a ship company would pay us—

Mr. BUCHANAN (interposing). No; suppose he would be under your men?

Mr. MARVIN. He would be under our men. He would not be in close touch with our district organization, because while these frosts are local in many of their features they are part of a great atmospheric condition over a large area of the country. This man would have to get his local maps from our reports, etc. The orchardists are enthusiastic over the service which saves a lot of money.

Mr. ANDERSON. People are always enthusiastic about things they get for nothing. Suppose we give you this \$12,000 and make its continuance contingent upon contributions by the people from out there, do you think they would do so?

Mr. MARVIN. They have already evidenced their sincerity this year by putting up about half the money themselves.

Mr. ANDERSON. Of course I think the real difficulty about this item is it is a special service which applies to one industry and a relatively small proportion of that industry. I have a feeling that if an appropriation of that kind should be made it would not be inappropriate.

ECONOMIC BENEFITS DERIVED.

Mr. MARVIN. I think that is sound. I want to say, however, that the bureau was created for this economic benefit. This as you say is local. It is local for southern California where they are highly organized and profit by it, but as the season advances these men move up into northern California, Oregon, and Washington, where the same work is being conducted, and in Colorado. We are giving the same information to truck garden communities of the South in Florida, and while it is local in one particular community, we are giving similar or somewhat local service all over the country.

Mr. BUCHANAN. You are giving general information in the South, as I understand it.

Mr. MARVIN. We are giving general information about hurricanes, because a hurricane covers a large area—it is general.

FROST OCCURRENCES AND REMEDIES TAKEN TO PREVENT DAMAGE.

Mr. BUCHANAN. This is a specific locality. When the frost occurs they had better put out their heaters and prevent the frost damage. You have to take your daily temperatures, and it requires a man on the ground to do that.

Mr. MARVIN. That taking of the daily temperature is done by the orchardists. They furnish us with these local reports, which are used, with the telegraphic reports from the 200 stations I spoke of, in order to make the forecasts and minimum-temperature predictions upon which successful protection depends.

Mr. ANDERSON. Perhaps we have got too narrow a view of what these people do. I gather from what you said, and Mr. Buchanan did, too, that these fellows went out with their thermometers and on the basis of that they make a forecast. From what you say, they get these reports from different areas and other points, and they get that and put them together on a certain date in order to determine what degree of frost there is going to be at a certain time.

Mr. MARVIN. The Weather Bureau man examines the reports and makes the forecast, not the growers. The Weather Bureau man makes the interpretation.

Mr. ANDERSON. You make numerous preliminary surveys in order to do that?

Mr. MARVIN. We make numerous preliminary surveys of local conditions, and it is from the meteorologist's knowledge of atmospheric conditions that he is able to forecast.

Mr. ANDERSON. How often does that frost occur?

Mr. MARVIN. This year we had an unusual year, as is shown by these photographs. Frost is an annual occurrence in this region.

I think more or less damage is done every year in the most important fruit districts of the West. Once in seven or eight years they get a frost damage like this.

Mr. ANDERSON. What I am getting at is what period of time, as a rule, do these frosts occur?

Mr. MARVIN. In southern California in the wintertime, in the frost season, November to February.

Mr. ANDERSON. You have to have a man in there, then, during the entire period of time that frosts occur?

Mr. MARVIN. Yes, sir; and then, up in the northern portions it is later in the season. They go up there about the 1st of March. Let me make one point, that this intensive work is not confined to the region we are talking about. This money is spent partly at some 20 or 25 other points in the United States, only not so extensively as on the Pacific coast. It is spent in California, Arizona, New Mexico, New Jersey, New England, Wisconsin, Illinois, Missouri, Kansas, Washington, and Oregon.

Mr. BUCHANAN. Is this amount exclusive of the salaries of the men?

Mr. MARVIN. No; that is inclusive of salaries.

Mr. BUCHANAN. Is this \$12,000 all you ask for instruments?

Mr. MARVIN. Not all of it. There are some instruments and some telegraphing that go in it. The fund is for salaries and incidental costs of travel, instruments, and things of that kind that are involved in the work.

OFFICIAL TRAVELING EXPENSES.

Mr. ANDERSON. Your next item is on the same page, for official traveling expenses. Is there any change in that?

Mr. MARVIN. No, sir. That is for the same amount.

Mr. ANDERSON. The next item is on page 45, for the maintenance of stations for observing, measuring, and investigating atmospheric phenomena, etc.

FOR MAINTENANCE OF STATIONS FOR OBSERVING, MEASURING, AND INVESTIGATING ATMOSPHERIC PHENOMENA, ETC.

Mr. MARVIN. That carries an increase and covers investigations the bureau makes in the upper-air conditions as distinguished from the service observations about which we have been speaking heretofore. The immediate practical use made of this is for flying-weather forecasting and giving information to aviators.

Mr. BUCHANAN. Upper-air forecasting?

AIDS TO WAR AND POST OFFICE DEPARTMENTS AIR SERVICE.

Mr. MARVIN. Yes, sir; aerological work, as we call it. We have been before Congress for some years since the war to have the amount that we now have for this purpose increased. The \$25,000 included in the Budget is but a small part of that really needed to give us all the information we need concerning upper-air conditions, and which we should have in order to make a thorough-going service, but with the \$25,000 we hope to be able to increase the service

to the Army and Navy and the Post Office Department very materially. I have here charts which show the airways over which the War Department is now operating from here to New York, to Langley Field, and to Dayton, Ohio. The second chart shows the post-office route between New York and San Francisco.

The Weather Bureau is in position to give information and advice as to weather conditions along air routes and is doing so to the best of its ability.

MILITARY FORCES IN GREAT NEED OF MORE AEROLOGICAL INFORMATION.

Army people are up flying very much of the time, as you know, and they need more information than we are able to give them at the flying stations and at posts at which operations are going on. This increase will enable us to give them additional information.

In a recent conversation with General Patrick I was telling him what we would be able to do if we could get more intensive service; that is, to get observation along this Langley Field and Bolling Field airway and to go to New York. I have here an extract from the Bulletin of the Balloon and Aircraft School, Scott Field, Belleville, Ill., for November, 1922, which illustrates the value of our advices to aeronautics.

[Extract from Bulletin of the Balloon and Aircraft School, Scott Field, Belleville, Ill., November, 1922.]

AN APPRECIATION OF THE WEATHER BUREAU.

No aeronaut can fail to appreciate the value of accurate weather information, particularly when making journeys of practical length. Yet, unfortunately, it appears that the burden of cooperation, which so evidently rests with us, is being taken up by the Weather Bureau.

On the recent trip of the C-2, as we have been informed in a lecture by Maj. H. A. Strauss, the ship's commander, the aid received from the Weather Bureau was not only invaluable but was given whole-heartedly, showing the bureau's interest to be 100 per cent. The most detailed statements, the best maps, and the most careful predictions were sent to the crew from Washington days in advance of the start, and the final reports were telegraphed to them at the Weather Bureau's expense. The interest thus shown by the Weather Bureau did not lag after completion of the westward leg, and the same excellent service was rendered on the return trip until the accident which occurred at San Antonio terminated the flight.

An appeal is made to each of you to familiarize yourselves more fully with the science of meteorology and to keep in closer touch with the publications of the Weather Bureau.

In addition to this, let's do our best to reciprocate.

Mr. MARVIN. I felt that that was significant of the appreciation of the service which the aeronautical people feel we are in a position to furnish them, and I feel it is work which means dollars and cents returned to the people.

Mr. BUCHANAN. How long in advance can you make a forecast in the upper air?

Mr. MARVIN. We do not attempt it for more than 24 hours, and very detailed forecasts can not be made that long in advance. It is for that reason we are asking for an increase in the appropriation.

WEEKLY WEATHER FORECASTS.

Mr. BUCHANAN. You are never able to make advance forecasts of longer than 36 hours, are you?

Mr. MARVIN. We are making weekly forecasts for agricultural interests couched in general terms. They are generally satisfactory.

Mr. BUCHANAN. How often do you make them?

Mr. MARVIN. Once a week—every Saturday—and they come out in the papers all over the country Saturday and Sunday. We are hopeful with continued studies to be able to extend the forecasts more than a week in advance. But that is an ambition of the meteorologist. Here is an aerological survey of the United States, giving a summary of what we have done within the past few years. When you think of the immense territory of the United States and that we have only six of these upper-air stations you can realize what it means.

Mr. ANDERSON. You have only six of these upper-air stations, have you?

Mr. MARVIN. We have six primary stations making observations with kites and balloons, etc. In addition to that we have nine balloon stations, sending up little pilot balloons into the upper winds.

Mr. ANDERSON. What do you propose to add to this \$25,000?

Mr. MARVIN. We are going to put in some additional stations. I have Mr. Gregg here, who is in charge of aerological work, and I think, perhaps, he can answer your questions best.

ADDITIONAL STATIONS URGENTLY NEEDED.

Mr. GREGG. We propose to put in about six stations. The actual number will depend upon where they are located and, of course, that will depend upon the needs of the Army, Navy, and mail air services. If the stations can be established at regular Weather Bureau stations now in operation, the cost will be about \$4,000 each; but if the stations are to be established at other places than where we have regular Weather Bureau stations, we shall have to put in fully equipped new stations costing about \$6,000 each. The probability is, however, that most of them can be placed at Weather Bureau stations.

Mr. ANDERSON. Where they are, do you have to employ men to do this particular work as distinguished from the ground observation?

Mr. GREGG. At the Weather Bureau stations?

Mr. ANDERSON. Yes, sir.

Mr. GREGG. We would have to assign one extra man with experience in upper-air work; in addition one of the regular men already employed at a station would be required to learn the work and assist in the observation. Each observation requires two men.

Mr. ANDERSON. How long are they in taking it?

Mr. GREGG. On the average an observation takes from an hour to an hour and a half.

Mr. ANDERSON. What do they do the rest of the time?

Mr. GREGG. At the regular Weather Bureau stations they do other work, such as is done at all Weather Bureau stations. At the primary stations where we do nothing but aerological work we make

observations with kites and that takes four to five hours each day, and two observations with pilot balloons each day, about an hour and a half each.

I may say, as to the time consumed, that it takes a good deal of time to compute or reduce the information to a point where it is usable. The hour and a half referred to is consumed in taking the observations.

Mr. ANDERSON. On an average, how high do these balloons and kites go?

Mr. GREGG. On an average kites ascend to about $1\frac{1}{2}$ or 2 miles; occasionally 3 or 4 miles. Balloons go up on an average I should say $2\frac{1}{2}$ or 3 miles, but occasionally as high as 10 or 15 miles. Of course the height reached depends entirely upon the state of the sky.

RESULTS OF OBSERVATIONS.

Mr. ANDERSON. From these observations are you able to predict the condition of the atmosphere with respect to storms, wind velocity and all that sort of thing in the upper air?

Mr. GREGG. That is the primary purpose of the observation. I might say that all these observations are sent to forecasting centers at Washington, Chicago and San Francisco, and forecasts for the 14 zones into which the country is divided are made and sent out twice daily by radio.

Mr. ANDERSON. Apparently all this has direct relationship to your daily forecasting. What relation has it to research and investigation and progress in meteorological science in general?

Mr. MARVIN. That is a matter I wanted to emphasize just before I asked Mr. Gregg to tell about the stations. The free air observations have great value and these publications are examples of the uses made of them in the study of upper air problems. This service for aviation is only one of the uses of the aerological work. The data have a very important bearing upon the phenomena of the circulation of the air out of which knowledge we hope to be able to improve our knowledge of the laws of forecasting.

Mr. BUCHANAN. How deep is the atmosphere? How high?

Mr. MARVIN. The highest points are perhaps three or four hundred miles in the atmosphere where meteors become luminous, when they penetrate the outermost portions of the atmosphere.

Mr. BUCHANAN. I thought they knew absolutely the height of the atmosphere.

Mr. MARVIN. Well, no; it goes on and on, more and more attenuated.

Mr. BUCHANAN. Is not there any limit to it out there—any limit to where the air extends?

Mr. MARVIN. Oh, no; not exactly. It has no definite outer boundary. It is all within three or four hundred miles. This report on upper air pressure maps is one of the studies that has been made of the free air data in the lower layers. It is one of the most important contributions to this science and deals with reducing pressure observation upward instead of reducing them to sea level, which is the ordinary practice.

USE OF AIRPLANES AND BALLOONS.

Mr. ANDERSON. Are airplanes or regular balloons used at all in making these observations? Have they been occasionally or regularly or otherwise used?

Mr. MARVIN. Very little use has been made up to the present time of airplanes for taking observations in the free air. We can get better results at less cost by taking observations with pilot balloons and kites, because we have better information as to the position of the balloon at the time. The instruments carried on airplanes and moving freely around have not heretofore been made useful in meteorological work.

Mr. ANDERSON. I would assume, not knowing anything about it all, that to be of any value you would have to have a series of observations. It would be very difficult, I would suppose, with an airplane, and expensive as well.

Mr. MARVIN. It is a much more expensive method of getting the observation.

Mr. GREGG. I may add that the principal element of interest in aviation is the wind, and it is quite difficult to make observations of the wind in an airplane.

Mr. ANDERSON. Which do you consider of the greater importance under this item—the general research work in its relation to the scientific study of meteorology or the forecast which you make for air travelers?

Mr. MARVIN. With respect to the increase, Mr. Chairman, we would hope out of that appropriation to derive the greatest immediate practical benefit from the forecasts to aviation, but I want to say this about the whole appropriation with its increase. It is the way we have of accumulating information which must go on for several years before we get data from which forecasts studies can be made. The work under this appropriation, apart from its benefits to aviation, is a contribution to science and is something the value of which increases with the accumulation of observations. It is only with the accumulation of these observations that useful research work can be carried out.

Mr. ANDERSON. When you get down to brass tacks, how extensive is air travel in this country at the present time?

Mr. MARVIN. The travel at the present time, I think, is limited to the Army and the Navy maneuvers and to the Post Office Department. I think weather advices are very important in developing aviation, and certainly this country ought not to be backward in developing civil aviation, regardless of its great need as a part of the national defense.

Mr. ANDERSON. That completes your item does it?

Mr. MARVIN. That is the only remaining item we have, Mr. Anderson. We would like to see this increase as an evidence of the support this feature of the work is getting, because we feel it is important both to practical aviation and to the science of meteorology.

Mr. ANDERSON. Is there any relationship at all between these upper-air observations and your forecast on the ground?

Mr. MARVIN. There is; the forecasters depend upon them every day. We use these reports that we get from the stations we now have and chart them in the office on the maps for the different levels and the

forecasters consults these charts every day at the time of making his forecast—not only for upper-air forecasting but for surface forecasting as well. I believe the improvement in the forecasting that has come about in the last several years is partly due to the upper-air data. I believe the results now attained in forecasting have never been surpassed.

TUESDAY, NOVEMBER 21, 1922.

BUREAU OF ANIMAL INDUSTRY.

STATEMENT OF DR. JOHN R. MOHLER, CHIEF BUREAU OF ANIMAL INDUSTRY.

Mr. ANDERSON. Doctor Mohler, do you want to make a preliminary statement before we start in on your statutory rolls?

Doctor MOHLER. Mr. Chairman, I have prepared a general statement of our work, which, if you care for it, I should like to submit to the committee.

Mr. ANDERSON. Very well, it will go into the record.

(The statement submitted by Doctor Mohler is here printed in full, as follows:)

GENERAL STATEMENT OF WORK.

The principal work of the Bureau of Animal Industry is conducted in the field among farmers and stockmen. This bureau gives its attention chiefly to live stock and dairy production, the control and eradication of contagious animal diseases; it conducts research and demonstrational work, guards our live-stock industry against invasions of foreign plagues, and protects public health through inspection of animals and their products which are intended for human food.

The bureau has in its employ 4,134 persons, of which 3,742 are assigned to duties in the field outside of Washington. The bureau originally consisted of an office, a laboratory, and small experiment station, and a personnel of approximately 25 persons. At present it consists of 11 main divisions, an experiment station, 6 smaller divisions or offices, and several experimental and demonstrational farms located in sections of the country best adapted to the purpose for which they are intended. A variety of projects beneficial to the farmer and live-stock producer are in progress on these farms.

RESULTS OF EXPERIMENTAL WORK MADE AVAILABLE TO FARMERS.

When research on any problem gives encouraging results, the method of applying the principles discovered are tried in an experimental way under conditions as nearly like those on the average farm as possible. The experimental farms are used for this purpose. When the method is considered well developed and suitable for general application it is made the basis for extension work by the States Relation Service through county agents. This method has been used with success in preventing losses from hog cholera, in tick eradication, for poultry culling, for lamb docking and castration, in the development of our cheese industry, and many other matters of importance. The general sequence of research, experiment, and extension is used with success by the Department of Agriculture, and the results have proved it to be the logical method of giving new facts to the public. Extension work is supplemented with literature, posters, lantern slides, motion pictures, radio, and similar devices.

MATTERS OF GENERAL INTEREST.

Farmers are encouraged to acquire more knowledge on the subject of sanitation and its importance in the prevention and control of animal diseases. They are encouraged to spend more time, labor, and money for clean-up and disin-

fection in proportion to the amount they now spend for drugs and remedies of various kinds and of doubtful value.

Live-stock owners are urged to exercise more care in preventing the introduction of diseases into their herds; prevention is cheaper and better than cure and eradication.

The elimination of tuberculosis from our bovine population is being pushed as rapidly as possible. The area method of eradication is the most rapid and economical. There is need for increasing the veterinary field force. Local veterinary practitioners have shown themselves capable of participating in tuberculosis eradication work under the accredited-herd plan, and it seems desirable as eradication is extended to turn more of this work over to them.

The bureau advocates the eradication of outbreaks of foot-and-mouth disease through the slaughter of all diseased and exposed susceptible animals, together with the application of quarantine, cleaning and disinfection of infected premises, and compensating the owners for animals and other property destroyed.

In the prevention of hog cholera the simultaneous treatment presents advantages over the serum-alone treatment in conferring permanent immunity and is preferable when properly administered by skilled operators.

The bureau is endeavoring to improve veterinary service by supervising the work of veterinary colleges and accrediting only those that maintain the required standard. Since the bureau employs approximately 1,400 veterinarians, it is able to exert some beneficial influence in that field.

The bureau aims to develop activities relating to the breeding, feeding, and general care of live stock in addition to conducting the disease-control work.

It is the policy to have persons working on the larger and more important practical agricultural problems to familiarize themselves thoroughly with field conditions by spending a considerable portion of their time in the field.

Bureau employees are kept in touch with agricultural matters through agricultural publications and the weekly summary of editorials which are circulated through the bureau laboratories and offices.

SOME OF THE IMPORTANT WORK ALREADY COMPLETED.

A review of the history of the various scientific divisions is convincing that the standards and policies maintained have resulted in success. The activities which have been carried to completion include:

The discovery of the nature of Texas fever; how it is conveyed from infected to susceptible bovines by an intermediate host, which is a tick; and the perfection of methods for exterminating the tick.

The complete eradication of contagious pleuropneumonia from this country. The United States was the first of the large nations of the world up to that time which, having been once extensively infected with pleuropneumonia, was able to extirpate it.

The discovery of the cause of hog cholera, the development of antihog-cholera serum, thus placing at the disposal of swine growers a reliable agent for preventing losses from that disease.

The eradication of tuberculosis from live stock in the District of Columbia, thus demonstrating the practicability of eradicating tuberculosis from definite areas.

Improved methods of making tuberculin for diagnosing tuberculosis in cattle and swine.

The prompt eradication of foot-and-mouth disease from the United States on six occasions.

The improvement through inspection and supervision of methods of handling live stock in interstate and export trade.

The exclusion from the United States through the enforcement of quarantine regulations of the serious animal scourges present in foreign countries with which we have extensive commercial relations.

The establishment of the most complete and dependable national system of meat inspection in the world.

The development of effective and economical apparatus and formulas for home, laboratory, and factory use.

The development of effective medicinal treatments for parasites. The carbon tetrachloride treatment for hookworms is one of the most recent treatments developed by the bureau.

IMPORTANT WORK NOW IN PROGRESS.

Among the activities of practical and popular interest now being conducted by the bureau are the following:

Tick eradication.—To date approximately 72 per cent of the 729,852 square miles placed under quarantine July 1, 1906, has been freed of cattle ticks and released. Tick eradication is progressing satisfactorily, but requires ample financial support—at least as much as in the past—if it is to be completed expeditiously and economically.

The inspection of meats.—The purpose of the Federal meat-inspection service is to eliminate diseased and otherwise unfit meat from the general food supply; to see that meat and products for human consumption are prepared in a cleanly manner; to guard against the use of harmful dyes, preservatives, chemicals, or other deleterious ingredients, and to prevent the use of false or misleading names or statements on labels. During the past year this service was conducted in 899 establishments engaged in interstate and foreign commerce in 263 cities and towns. The service covers about 70 per cent of the meat and meat food products produced in this country, at a cost of less than 6 cents per animal slaughtered.

Hog-cholera work among farmers.—Hog-cholera control work is being carried on in cooperation with 84 States. Approximately 91 bureau veterinarians are engaged. In 1921 the losses from hog cholera were reduced to 39.3 per 1,000 swine raised. In 1922 there was an increase to 48.7 per 1,000. The increase no doubt was due to the inability of farmers in some sections to have their hogs immunized, owing to the financial conditions that prevailed in the farming sections.

This increase in mortality shows the necessity for continued vigilance and action in coping with the disease. Farmers yet need advice and assistance in fighting hog cholera, and they, as well as many veterinary practitioners, look to the representatives of the Department of Agriculture for expert, reliable advice. The hog is the farmer's most reliable stand-by for procuring money to pay his taxes and meet other obligations, and there should be no decrease at this time in the protection of the swine industry.

Eradication of scabies in sheep.—The prospects are that there will be considerable spread of the infection in Arizona and New Mexico during this fall and winter. Eradication is progressing satisfactorily in Texas, Colorado, Wyoming, Utah, Idaho, Nevada, Oregon, and California. During the past fiscal year bureau employees in the field made 24,190,956 inspections and supervised 8,869,386 dippings. When given an opportunity, this disease spreads rapidly and is very destructive; therefore there should be no relaxation in efforts to control and eradicate scabies in sheep and cattle.

Eradicating cattle scabies.—Rather extensive outbreaks of this disease occurred last winter in Arizona, Utah, and Nevada, three States formerly not affected. This disease also exists to some extent in Oklahoma, Texas, New Mexico, Colorado, Wyoming, South Dakota, and Montana. Last year 1,508,924 cattle were inspected in the field and 453,708 were dipped.

Supervision of interstate transportation of live stock.—Last year 20,462,270 sheep, 18,475,991 cattle, 37,449,594 swine, and 10,085 horses were inspected at public stockyards and unloading points. When disease is found the origin of infected shipments is immediately reported to the live stock sanitary officials of the States concerned. Fines amounting to \$17,000 were collected last year for violations of the law.

Enforcement of the 28-hour law.—The transportation of animals requires constant attention to prevent cruelty to the animals while in transit. Last year fines amounting to \$100,000 were collected, approximately four times the cost of enforcing the law.

The enforcement of quarantine regulations.—Although rinderpest, contagious pleuropneumonia, foot-and-mouth disease, and surra have been prevalent in various parts of the world, our quarantine regulations have proved effectual in preventing invasions of these diseases.

The eradication of bovine tuberculosis.—Every State in the Union is co-operating with the bureau in this work. At present there are 19,005 herds, numbering 417,917 animals, on the list of fully accredited herds; 205,063 herds, numbering 1,890,572 animals, are in process of being accredited. The quicker the eradication of this disease is accomplished the less it will cost and the fewer will be the losses in the meantime.

Hog cholera research.—It is known that this work has resulted in a saving of many millions of dollars to the farmers of the country, and it is believed that it has been largely responsible for increasing hog production after it had reached a low ebb about the time antihog-cholera serum was developed by the bureau.

Investigations of dips and disinfectants.—As a result of this work the inspection and quarantine work, as well as tick eradication work, has been placed on a firmer basis. Means have been provided by the bureau for testing the strength at any time of the dip in vats ready for use.

Investigations of meats.—Research work has been directed toward studies of the changes in fresh beef during cold storage, the effect of salting, chemical studies of the nutritive value, vitamin content, etc.

The production of tuberculin.—The total amount of tuberculin produced for the use of its inspectors in the field during the fiscal year 1922 amounted in round numbers to 7,330,911 doses, at a cost of \$24,743. The tuberculin would have cost approximately \$200,000 if the bureau had been obliged to buy it at present market prices.

The field investigations in the control of round worms.—In swine, stomach worms in sheep, and warble infestation among cattle are being extended.

Investigation of animal abortion.—This work includes a study of the etiology of the disease, the development of methods of control, the difference in the various microorganisms responsible for abortion among domestic animals, and the various chemical agents for the suppression of the disease.

Investigation of tuberculosis of animals.—This work includes the study of the causes on which the spread of tuberculosis among animals depends, studies covering the tuberculin test, and other tests for tuberculosis, studies of the different types of the tubercle bacillus, their economic significance, etc.

Supervision of plants which produce biological products, especially hog-cholera serum and virus.—During the year 1921 there were produced 476,955,955 c. c.'s of antihog-cholera serum and 26,252,175 c. c.'s of virus. The indications are that 900,000,000 c. c.'s of the serum will be produced during the present year.

Butter and by-products.—This project is designed to increase the efficiency of butter making by the economic utilization of by-products, including the production of different kinds of cheeses and albumen products.

Condensed milk investigations.—Studies are being made of the factors which control the commercial quality of condensed and evaporated milk.

Nutrition of dairy cows and secretion of milk.—The object of this study is to learn more of the process by which the cow converts the nutrients of the feed into milk.

Dairy sanitation research.—The object is to study the sanitation of city milk supplies, the factors influencing the commercial quality of milk, and devise means for producing and handling milk of superior quality.

Research in animal genetics.—Exhaustive experiments are being conducted to obtain more definite information concerning the principles of heredity.

The development of an American breed of horses.

The rehabilitation of the Morgan breed of horses.

A 20-year experiment to determine how the milking qualities of cattle are transmitted.

Detailed experiments on inbreeding of cattle and swine.

Development of a breed of sheep about equally valuable for wool and meat.

Methods of making Swiss, Roquefort, Camembert, and similar foreign cheeses.

A study of the physiology of milk secretion.

Continuous work is being done on stock-poisoning plants. This problem is especially important on western ranges.

A study of soft pork to ascertain the causes and means of prevention.

The bureau is engaged in many other problems which are of scientific and economic importance, and progress is likewise being made in their solution.

SALARIES.

Doctor MOHLER. Mr. Chairman, the first change affecting the Bureau of Animal Industry is on page 47 in the statutory roll. There has been transferred from the statutory roll of the bureau to the statutory roll of the Secretary one editor and compiler at \$2,250:

that is a transfer of one man to the Secretary's office who will be assigned to the office of editorial and distribution work.

In addition to that change, it has been recommended to drop 27 clerks, laboratory assistants, carpenters, skilled laborers, messenger boys, and charwomen from the statutory roll, and these positions will be dropped on the 1st of next July if approved.

Mr. ANDERSON. Are there any of them vacant now?

Doctor MOHLER. Some of them are vacant now; but the principal reason for dropping these positions is on account of the efficiency of the other persons who are in correlated positions and of the reduction of work in consequence of some reductions to be made next year.

We could, no doubt, fill these five clerical positions, but nevertheless we have recommended that these five positions of \$960 clerks be omitted.

Mr. ANDERSON. Is there any other change in the language of the general item?

Doctor MOHLER. No, sir; there is no change there.

GENERAL EXPENSE APPROPRIATION.

Mr. ANDERSON. And the next appropriation item is on 50 and 51, inspection, quarantine work, etc.

FOR INSPECTION AND QUARANTINE WORK.

Doctor MOHLER. This item is a general item on inspection and quarantine and covers the work we are doing on the eradication of scabies in cattle and sheep, the supervision of the transportation of live stock at the various stockyards, the importations of animals from abroad, and other work, like mallein testing of animals going interstate. The amount requested this year is exactly the same as that last year.

DIPPING OF CATTLE.

A widespread and prolonged drought during the summer months in Arizona and New Mexico interfered seriously with the dipping of affected and exposed sheep. As a result the present outlook is that there will be considerable spread of infection this fall and winter in those States. In Texas, Colorado, Wyoming, Utah, Idaho, Nevada, Oregon, and California, the other range States in which scabies is quite prevalent, the work has progressed in a satisfactory manner.

A considerable number of outbreaks of the disease has occurred in the Corn Belt States. The bureau has extended all possible assistance to the live-stock sanitary officials of those States in arresting such outbreaks. Additional employees, so far as funds will permit, will be assigned to field work during the coming spring in the States most urgently in need of assistance. During the past fiscal year bureau employees in the field made 24,190,956 inspections and supervised 8,869,386 dippings of sheep.

The work will be continued along the same lines as at present during the coming fiscal year. Further intensive work will be necessary for a number of years, however, before any relaxation of our efforts can be safely permitted.

OUTBREAKS OF SCABIES IN CATTLE.

Rather extensive outbreaks of scabies in cattle occurred last winter in Arizona, Utah, and Nevada—three States formerly not affected. As soon as these outbreaks were discovered, the bureau took prompt and vigorous action to assist the State authorities concerned in preventing any further spread of the disease, and at as early a date as weather conditions would permit detailed employees to inspect all animals in affected localities and to supervise the dipping of all diseased and exposed cattle. In Oklahoma, Texas, New Mexico, Colorado, Wyoming, South Dakota, and Montana, and other range States in which cattle scabies prevails quite extensively, satisfactory progress has been made.

In view of the spread of the disease to the three States first mentioned, however, it is doubtful whether the situation on the whole is any better than a year ago. In accordance with the usual custom, such employees as can be spared from public stockyards work during the spring months will be detailed to those sections where this disease is causing the most trouble. The inspections and dippings of cattle for scabies in the field during the past fiscal year were 1,508,924 and 453,708, respectively.

Mr. ANDERSON. Is this on eradication basis?

Doctor MOHLER. Yes, sir; it is on a complete eradication basis.

Mr. ANDERSON. And you are proceeding consistently to try to get rid of it altogether?

Doctor MOHLER. Yes, sir. In some States we have not had any scabies for a number of years. I told you last year, however, that since the war we have had three or four years of drought. That obtains at the present time in Arizona and New Mexico, particularly, with our sheep work, and in the Northern Great Plains section—Montana and through the Dakotas and Wyoming—with our cattle work. When we get these droughts we are sensible enough not to insist on the full enforcement of our regulations. The ranchmen do not have enough water to spare for dipping purposes, and under those conditions we allow the cattle to go to market for slaughter without any restrictions, except to keep them from coming in contact with healthy animals.

Mr. BUCHANAN. What causes scabies?

Doctor MOHLER. It is a small mite or parasite.

Mr. BUCHANAN. It is not a tick?

Doctor MOHLER. No, sir. It is much smaller than the tick. You cannot see it with the naked eye. The only thing you see is the effect, where it burrows in the skin and forms little tunnels under the surface and destroys the wool of the sheep and kills the hair on the cattle, with resulting anemia and emaciation.

SUPERVISION OF INTERSTATE TRANSPORTATION OF LIVE STOCK.

Another item in this project is the supervision of interstate transportation of live stock. Under this project all live stock received at stockyards are inspected for contagious, infectious and communicable diseases and appropriate treatment, when indicated, is supervised by bureau employees in order that the animals may be shipped to country points for feeding, breeding, and stocking

purposes. There is a tendency on the part of many shippers when they find that they have any disease in their herds to immediately load the animals on the cars and ship them to market.

Diseased animals detected by means of this inspection service are prohibited shipment to country points, thereby preventing further dissemination of the disease. The origin of infected shipments is immediately reported to the live stock sanitary officials of the States concerned. In this way centers of infection are located and quite often the spread of the disease from the farm or ranch where it first occurred is prevented. The inspections made and the treatments accomplished at the public stockyards during the past year in connection with the supervision of interstate transportation were as follows: Sheep, 20,462,270 inspected and over 1,000,000 dipped; cattle, 18,475,991 inspected and 11,000,000 dipped; swine, 37,000,000 inspected and 393,000 immunized against hog cholera.

MR. ANDERSON. You mean antemortem inspection?

DOCTOR MOHLER. Yes, sir; these are antemortem inspections of live stock for various contagious diseases.

MR. ANDERSON. Always preliminary to inspection of shipments out into the country?

DOCTOR MOHLER. Always preliminary to shipments from the public stockyards.

There were 10,000 horses inspected and 4,000 tested, largely with mallein for the presence of glanders.

TWENTY-EGHT-HOUR LAW.

No change is contemplated in the conduct of the administrative work to secure compliance with the provisions of the 28-hour law. During the past year there has been a considerable decrease in the number of violations that have been detected. Energetic efforts have been made to bring to trial cases covering violations that had occurred during previous years with the result that fines amounting to about \$100,000 were collected, approximately four times the allotment expended by the bureau in enforcing the law.

MR. ANDERSON. Have you found that anything objectionable results from the enforcing of the 28-hour law? I have understood, for example, that shipments which were coming into Chicago, where they were approaching the 28-hour limit, would be held out at some way station before being shipped into the yards, in order to avoid congestion in the yards or violation of the 28-hour law, by reason of failure to get them in inside the limits.

DOCTOR MOHLER. No, Mr. Chairman, we have not found anything like that; in fact, we have treated this character of shipment you are referring to with a great deal of leniency. If the crew brings the train of cattle up to the yards, and it is merely a question of unavoidable congestion in front, we do not take a case like that to court. All during the strike which began the 1st of July, we have not stopped our men from reporting these cases, but when they were reported we did not attempt to have the cases go to court, as the officials had no control at all of the situation on account of the strike on these railroads.

Our greatest trouble just now is through the Pittsburgh yards. That is the neck of the bottle of all shipment from the Southwest, West, and Northwest, and the roads there at Pittsburgh have not the facil-

ities for handling the immense numbers of animals that go through to New England points, and to Baltimore, Philadelphia, and New York from the West.

DISTRIBUTION AND PREPARATION OF BLACKLEG VACCINE.

There is only one other point I would like to mention in this particular item, and that is with reference to blackleg vaccine. The distribution and preparation of vaccine ceased on the 30th of last June, in accordance with the wishes of Congress.

Mr. ANDERSON. Is it necessary to continue this language to keep it up?

Doctor MOHLER. I do not think so. We have that understanding, that we are not going to go into it any further.

Mr. ANDERSON. I want to ask you about this \$15,000 for keeping up quarantine stations. My recollection is that that has only been carried two years.

Doctor MOHLER. Yes, sir.

MAINTENANCE OF LIVE-STOCK STATIONS.

Mr. ANDERSON. And my recollection is that you also had about \$30,000 worth of work you wanted to do?

Doctor MOHLER. That was three years ago, but you know barns do not stay in repair three years. We did not have any money for the repair of those 30 barns at Boston, New York, and Baltimore for six years until two years ago, when we got \$15,000. That money was used for taking care of most of the work needed to be done at the New York station, which is the most popular of our stations; and the \$15,000 received this year we are using for repairing the eight barns at Littleton, just outside of Boston. It will not go as far as it would have gone three years ago, when we planned for \$30,000. Those barns are affected with dry-rot; the woodwork and basement are all rotten, so that we can not use any of it.

We had to start in at the ground and put in a concrete floor and sides up as high as 5 feet in order to make any use of the barns. That work is being done now. We would like to have the station opened for the consignment of a lot of Scotch cattle that will be shipped from Glasgow on the 15th of December. The foot-and-mouth disease outbreak has greatly improved in Great Britain, and there has not been any of this disease in Scotland for five months, so we are just opening the ports of the United States to Scotch cattle. The importers prefer to come into Boston, but on account of the barns not being fixed up for receiving the cattle they will have to come in at Baltimore. Some of this \$15,000 will be used to complete the work that is now under construction in Boston, and the balance will be used at the station at Baltimore that has not received any attention since the war.

Mr. ANDERSON. How many stations have you where you receive live cattle?

Doctor MOHLER. We receive at those three points mentioned on the Atlantic coast, which are the only places where we have quarantine stations. But occasionally we provide for quarantine of cattle

at San Francisco. In that case the importer hires a stable and we keep the animals under supervision.

Mr. ANDERSON. The stock business in Scotland must be about as it is here if they can afford to ship them here at present prices.

Doctor MOHLER. It is in just about the same shape. There have not been any shipments allowed out of England on account of the prevalence of the foot-and-mouth disease for about 10 months. We have allowed some animals to come in from the Islands of Jersey and Guernsey, the first starting about the 15th of October, which is the only importation that has gone through quarantine this year. They came in at New York.

Mr. ANDERSON. How long did you have to keep them there?

Doctor MOHLER. Thirty days from the date of arrival. That gives an additional guaranty of 30 days to the 14 days that the animals are on shipboard.

Mr. ANDERSON. What does it cost—is the feeding and that sort of thing borne by the importer?

Doctor MOHLER. That is borne entirely by the importers. They have to have their own attendants, their own feed, and all supplies must be furnished by the importer; in fact, under present conditions we are requiring the importer to get all his grain and hay from this side and take it over on the boat that he is going to bring the cattle back on, so that we avoid thereby the possibility of buying hay from farms in England where foot-and-mouth disease possibly existed.

Mr. ANDERSON. The importation must be rather expensive and a tedious job, then, I should think?

Doctor MOHLER. Only the wealthy are importing, Mr. Chairman.

Mr. ANDERSON. These are show stock, evidently?

Doctor MOHLER. Yes. They are bought by wealthy people, who are doing the importing.

ERADICATION OF TUBERCULOSIS.

The next item is on page 53, which covers our work on tuberculosis, its control and eradication. You know, Mr. Chairman, this work has increased tremendously and I have prepared several tables of figures which I would like to insert in the record.

PROGRESS OF WORK.

Mr. ANDERSON. I think you better make a statement; I may want to ask some questions about it.

Doctor MOHLER. The work on tuberculosis progressed at a more rapid rate during the last fiscal year than any previous year. During the 1921 fiscal year there were under the supervision for the control and eradication of tuberculosis 71,806 herds containing 1,195,797 head of cattle. At the end of the fiscal year terminating June 30, 1922, there were 212,182 herds of cattle containing 2,616,395 head under supervision, an increase of 140,376 herds and 1,420,598 head of cattle. In other words, the work during that fiscal year more than doubled.

On June 30, 1922, there were 16,216 fully accredited herds containing 363,902 cattle, as against 8,201 accredited herds containing 193,620 cattle on June 30, 1921, an increase of 8,015 herds and 170,262 cattle.

Once-tested free herds increased from 49,814 herds containing 643,233 cattle to 161,533 herds containing 1,548,183 cattle, an increase of 111,717 herds and 904,950 heads of cattle.

The eradication of tuberculosis from live stock by means of the tuberculin testing of all cattle within a given area is accepted as the best approved method of proceeding against the existence of tuberculosis in live stock. While this project was a part of the original program, it could not be put into effect until sufficient sentiment was aroused among the live-stock owners by means of the individual accredited herd. But from present indications it is believed that area work may be carried on at the present time in practically every State.

The table here shows that the number of claims for the payment of indemnity for tuberculous cattle increased during the 1922 fiscal year by approximately 10,000. A total of 19,597 claims were received by the department that year.

Summary of indemnity claims.

| Fiscal year. | Number of claims. | Number of cattle. | Average appraisal. | Average salvage. | Federal indemnity. | State indemnity. |
|--------------|-------------------|-------------------|--------------------|------------------|--------------------|------------------|
| 1921..... | 9,925 | 38,656 | \$149.68 | \$22.41 | \$27.23 | \$54.13 |
| 1922..... | 19,597 | 60,320 | 111.67 | 17.78 | 23.54 | 35.91 |

The average appraisal for tubercular cattle was reduced from \$149.68 in 1921 to \$111.67 in 1922, an average reduction of \$38.01 per head. Owing to the falling off in the value of cattle, the amount of salvage for tubercular animals dropped from \$22.41 during the 1921 fiscal year to \$17.78 during 1922, an average reduction of \$4.63, but, notwithstanding that fact, the average amount of indemnity paid by the Federal Government for the 1922 fiscal year was \$3.69 less than for the previous year.

AID FROM STATES.

The legislatures of approximately 40 States will convene during the winter of 1922-23, and inasmuch as tuberculosis eradication work is being carried on in each of those States and there is a continued demand for the work, it is estimated that the funds which will be made available for the next biennium period will increase the present funds by at least 50 per cent, making a total of approximately \$6,500,000 that the States will have available for the cooperative campaign.

A campaign for the eradication of tuberculosis of live stock is well launched in every State. There are, however, a number of States that have made phenomenal progress in the suppression of the disease. If the work can be carried on for a period of 10 years, it is confidently believed that more than half of the States will have reduced tuberculosis to such a degree that it will no longer be a hindrance to the development of the live-stock industry. In a great

many of the States it will have been practically exterminated by that time, and it is a matter of great satisfaction that in those States that are making such splendid progress they have put up the barriers that will preclude the introduction of tubercular cattle from other States.

With the cleaning up of one-half of the States, concentration can be made on the balance of the territory in which the infection exists, and by the continued interest of the live-stock owners satisfactory progress can be made until the job is fully consummated.

During the current year we have made a survey of the entire country and have figured on a map the percentage of tuberculosis in every county in every State. The figures show that in over 1,600,000 square miles, or an area of about 46 per cent of the entire country, there is 0.6 of 1 per cent tuberculosis; in 21 per cent of the remaining country there is 2.1 per cent of tuberculosis; in 26 per cent of the balance of the territory there is 4.9 per cent of tuberculosis. In 4 per cent of the area there is over 10 per cent, while in only $1\frac{1}{2}$ per cent, or 53,739 square miles, is the disease present in over 15 per cent of the cattle. It averages about 26 per cent in the worst infected area.

TUBERCULOSIS IN HOGS.

Mr. ANDERSON. Has this campaign reflected so far appreciably in the reduction of tuberculosis in hogs?

Doctor MOHLER. No, sir; it has not. In fact, the opposite is true. There is an increase in tuberculosis in hogs, as figured out by statistics of the various slaughtering houses; but, on the other hand, there is a marked decrease in the amount of tuberculosis in cattle, as determined by slaughterhouse statistics.

Mr. ANDERSON. One of the things that I supposed—it was hoped, at least—would result in this campaign, was a reflected reduction of tuberculosis in hogs.

Doctor MOHLER. That is very true, and there is only one explanation that I can make about the increase of tuberculosis among hogs, and that is that the hogs are not getting all their disease from cattle. In the last 12 months we have found a great increase among tuberculosis of chickens. This avian form of tuberculosis was known to exist in California, Oregon, and four or five of the Eastern States; but, as I said before, in the last year we have found it to exist in 24 or 25 States, especially in the Central West—in Iowa, for instance. It is a well-known fact that when chickens die on the farm they are thrown over in the hog lot, and the hogs eat them. It is equally well-known that hogs are very susceptible to the avian type of tuberculosis. We have taken tuberculous tissues from hogs and have found the avian form of the germ in those tissues, so that it looks to me as if the increase in tuberculosis among hogs is due to the increase of tuberculosis among chickens, and that the hogs are contracting a great deal of this disease from eating or associating with tuberculous chickens.

One of the gentlemen attending the conference of Agricultural College workers here this week, told me that they were conducting an experiment at the Illinois Station with hogs housed under the chicken roosts, with the idea of determining whether the hogs would contract the disease by merely associating with tuberculous chickens. There is no doubt but what they can, because we have worked that out here in our laboratory in Washington.

Mr. ANDERSON. Will you give us a statement showing the allotment of this fund to the States and the sums spent in the States by the States themselves and other agencies?

Doctor MOHLER. Yes, sir. I have a statement of that kind.

(The table referred to and submitted by Doctor Mohler is here printed in full as follows:)

Indemnity funds for tuberculosis eradication.

| | Expenditures, fiscal year 1923. | | Allotment of Federal funds for 1923. |
|---------------------|---------------------------------|--------------|--------------------------------------|
| | Federal. | State. | |
| Alaska..... | \$605.42 | \$1,335.13 | \$3,000.00 |
| Arizona..... | | | 5,000.00 |
| Colorado..... | 1,416.13 | 1,416.13 | 4,800.00 |
| Connecticut..... | 46,999.91 | 92,289.81 | 50,000.00 |
| Delaware..... | 20,820.78 | 36,923.53 | 24,000.00 |
| Florida..... | 1,351.79 | 2,755.15 | 2,500.00 |
| Hawaii..... | 2,001.38 | 10,426.57 | 5,000.00 |
| Idaho..... | 8,097.59 | 8,097.59 | 12,000.00 |
| Illinois..... | 74,198.34 | 74,198.34 | 100,000.00 |
| Indiana..... | 68,295.70 | 80,793.30 | 80,000.00 |
| Iowa..... | 136,141.11 | 157,134.29 | 150,000.00 |
| Kansas..... | 19,380.68 | 43,881.22 | 24,000.00 |
| Kentucky..... | 17,341.17 | 44,426.86 | 20,000.00 |
| Maine..... | 20,669.96 | 57,827.81 | 22,000.00 |
| Maryland..... | 37,158.30 | 37,158.30 | 60,000.00 |
| Massachusetts..... | 972.37 | 2,525.00 | 40,000.00 |
| Michigan..... | 102,306.09 | 213,204.47 | 120,000.00 |
| Minnesota..... | 29,929.15 | 59,415.15 | 50,000.00 |
| Mississippi..... | 2,181.20 | 4,054.94 | 3,000.00 |
| Missouri..... | 42,205.92 | 42,205.92 | 50,000.00 |
| Montana..... | 16,155.31 | 39,483.18 | 25,000.00 |
| Nebraska..... | 70,022.35 | 70,021.91 | 85,000.00 |
| Nevada..... | 7,077.98 | 11,772.65 | 10,000.00 |
| New Hampshire..... | 28,012.25 | 53,233.15 | 40,000.00 |
| New Jersey..... | 39,223.68 | 69,862.46 | 40,000.00 |
| New Mexico..... | 1,201.33 | 1,201.33 | 2,000.00 |
| New York..... | 224,782.34 | 532,009.66 | 280,000.00 |
| North Carolina..... | 10,479.06 | 10,479.06 | 20,000.00 |
| North Dakota..... | 14,848.69 | 14,848.69 | 25,000.00 |
| Ohio..... | 41,693.79 | 41,694.20 | 50,000.00 |
| Oklahoma..... | 11,020.54 | 20,139.13 | 30,000.00 |
| Oregon..... | 16,538.93 | 16,541.23 | 25,000.00 |
| Pennsylvania..... | 13,263.60 | 20,030.17 | 100,000.00 |
| Rhode Island..... | 3,176.98 | 6,416.65 | 10,000.00 |
| South Carolina..... | 3,407.56 | 3,407.56 | 4,500.00 |
| South Dakota..... | 16,017.73 | 27,719.67 | 24,000.00 |
| Tennessee..... | 2,086.06 | 4,391.67 | 2,000.00 |
| Texas..... | 16,158.81 | 16,259.58 | 27,000.00 |
| Utah..... | 6,175.88 | 6,175.88 | 12,000.00 |
| Vermont..... | 91,871.03 | 91,871.23 | 100,000.00 |
| Virginia..... | 16,410.76 | 21,422.73 | 17,000.00 |
| Washington..... | 32,732.27 | 32,732.30 | 40,000.00 |
| West Virginia..... | 9,627.08 | 19,372.15 | 12,000.00 |
| Wisconsin..... | 117,567.27 | 121,573.31 | 120,000.00 |
| Wyoming..... | 3,638.58 | 3,982.93 | 6,000.00 |
| Total..... | 1,445,262.85 | 2,226,711.99 | 1,931,900.00 |

FUNDS FOR OPERATING EXPENSES.

Mr. ANDERSON. How is the proportion of the provision between operating expenses and indemnity standing up so far this year?

Doctor MOHLER. The funds for operating expenses are going rather fast. We have finished one-third of the year, and if we kept up at the same rate we have been going we would have a deficit of \$90,000. So what is happening is that we are now starting to decrease our forces in order to conserve the funds. Otherwise they would be exhausted in May if we kept on working at the same rate we have been going.

Mr. ANDERSON. On the ratio at which you are now working are the indemnities sufficient or more than sufficient or inadequate?

Doctor MOHLER. They will be inadequate, but not nearly so inadequate as the operating expenses if we kept on the same way we were running the first four months of this year.

Mr. ANDERSON. What is the inducement to operate on the present basis with the work that is being done by the States?

Doctor MOHLER. We are working now in all the 48 States of the Union, and the Territories of Alaska and Hawaii. California just came in the last year. And we are doing a great deal of this area work—in fact, we are working in 450 counties, which reduces considerably the testing cost per head as well as the amount of indemnity. A whole county is worked on this area plan. The reactors are all assembled at one point. Our men bring in the buyers; there is competition. They are all sold to the highest bidder, and the result has been a great saving in the salvage.

So we are saving considerable in that respect on our indemnity fund. But drives like that require a lot of men and our operating expenses are not going to hold out unless we reduce our force, and that is what we have been doing the past two weeks. There is, of course, a great deal of complaint from the States where we have taken off some of our men.

Mr. ANDERSON. Did you spend all of this sum—\$300,000—which was made immediately available in 1922?

Doctor MOHLER. No, sir. About half of that was carried over to this year.

Mr. ANDERSON. That would mean an increase in the fund this year, would it not?

Doctor MOHLER. No; because the whole amount for this year is \$2,020,700, of which \$300,000 was available last year.

Mr. ANDERSON. I know; but if you spent it last year you did not spend it this year.

Doctor MOHLER. No.

Mr. ANDERSON. So that during the period of next year you will have more money to spend than you did this year?

Doctor MOHLER. Yes; by that amount of money—I see what you mean—we spent about one-half of that money, or a little over \$130,000, that was immediately available.

Mr. ANDERSON. Will you get through in 1922 without a deficiency?

Doctor MOHLER. We are going to get through without a deficiency, Mr. Chairman. But whether we are going to have to stop on the 1st of May or not I am unable to say.

Mr. ANDERSON. That all depends, does it not, on how fast you spend your money?

Doctor MOHLER. Yes; that is what I referred to a while ago, that we had to take off some of our men in order to keep within the limit—

Mr. ANDERSON (interposing). What is the basis of allotment now, 1 to 3?

Doctor MOHLER. About 1 to 2. On the 1st of January these 36 to 40 States will have their legislatures in session appropriating additional tuberculosis funds, and they are going to crowd us very hard in the spring months, but we are not going to create any de-

ficiency. We will work along this \$850,000 operating fund until it is exhausted, and then we will have to stop. But we are trying to spread it out so it will cover over the 12 months and not spend it all the first six months, for instance.

Mr. ANDERSON. You made that statement of the proportion of the tuberculosis in different territories. Are your operations generally in the territories in which the larger percentage of tuberculosis maintains?

Doctor MOHLER. Yes, sir; speaking generally. We have our largest force in New York, for instance, and that State has as much tuberculosis as any other State in the Union, and they are also appropriating the largest amount of money. They have this year one and a half million dollars in New York State alone, and we have tried to put our \$2,000,000 for all the States against the various State appropriations of over \$3,500,000. We therefore have allotted about \$2 for each \$3.50 of the State money, and that is the reason why New York State has received more than some of the other States, because she has spent more on her own disease control.

TUBERCULOSIS WORK IN TEXAS.

Mr. BUCHANAN. Is there any tuberculosis in Texas?

Doctor MOHLER. Yes sir; there is.

Mr. ANDERSON. Can you put that map in the record in the form of a statement?

Doctor MOHLER. Yes, sir; and I shall be glad to do so.

Mr. BUCHANAN. I did not suppose that tuberculosis was in Texas.

Doctor MOHLER. It is not at all extensive in Texas, but you have enough dairy herds near the larger cities of Dallas, Houston, El Paso, Fort Worth, etc., to give you a small proportion of the disease.

Mr. BUCHANAN. Around these little circles is where it is supposed to be present?

Doctor MOHLER (referring to map). Where the dots are you have less than six-tenths of 1 per cent.

Mr. BUCHANAN. We have it in all sections?

Doctor MOHLER. Yes; but more in certain sections, and so far as I am informed it is chiefly among the dairy cattle.

Mr. BUCHANAN. That is Jerseys?

Doctor MOHLER. Jerseys and Holsteins, largely.

Mr. BUCHANAN. According to this, then, Texas has less than any other State?

Doctor MOHLER. She has very little in proportion to her large number of cattle and her square miles of territory, but I shall be very glad to interpret that map in the form of a table. It shows you how the dairy sections of Iowa, New York, and northeastern Illinois are burdened with it.

(The table is as follows:)

Extent of bovine tuberculosis in United States.

| Approximate extent. | Total square miles. | Per cent square miles. | Total cattle. | Per cent cattle. | Per cent tuberculosis. |
|---|---------------------|------------------------|---------------|------------------|------------------------|
| 1 per cent or more..... | 1,673,616 | 46.4 | 28,338,254 | 41.2 | 0.6 |
| More than 1, not more than 3 per cent..... | 780,856 | 21.7 | 17,484,566 | 25.4 | 2.1 |
| More than 3, not more than 7 per cent..... | 952,664 | 26.4 | 12,397,445 | 18.1 | 4.9 |
| More than 7, not more than 15 per cent..... | 143,827 | 4.0 | 7,590,487 | 11.0 | 10.4 |
| More than 15 per cent..... | 53,739 | 1.5 | 2,960,954 | 4.3 | 26.0 |
| Grand total..... | 3,604,702 | 100.0 | 68,771,706 | 100.0 | 4.0 |

Mr. BUCHANAN. Is this confined to dairy cattle in Texas?

Doctor MOHLER. Yes, sir; almost entirely.

ERADICATION OF SOUTHERN CATTLE TICKS.

Mr. ANDERSON. We will now take up, on page 56, the item "For all necessary expenses for the eradication of southern cattle ticks."

Doctor MOHLER. Systematic tick eradication in cooperation with State authorities was conducted in quarantined counties or parishes in 7 States as follows: Alabama, 4 counties; Arkansas, 9 counties; Georgia, 21 counties; Louisiana, 7 parishes; North Carolina, 2 counties; Oklahoma, 3 counties; and Texas, 41 counties. As a result of the work accomplished, the following areas were released from Federal quarantine last year:

| States. | Counties or parts of counties. | Square miles. |
|--------------------------|--------------------------------|---------------|
| Georgia..... | 16 | 5,873 |
| Louisiana..... | 4 | 1,946 |
| North Carolina..... | 2 | 517 |
| Texas..... | 27 | 21,227 |
| Total area released..... | | 29,563 |

Practically all of these counties released from Federal quarantine contained at the time of release a few herds which it was necessary for State authorities to hold under local quarantine on account of tick infestation or exposure thereto. This action was agreed upon by the State authorities in consideration of the release of these areas from Federal quarantine.

During the year final clean-up work in released areas was supervised in 10 States in 301 counties which had been previously released from Federal quarantine but in which some tick-infested or exposed herds of cattle still existed in limited areas.

In addition to the systematic work in quarantined areas and final clean-up efforts in released areas, a great deal of preliminary work was done in 29 counties. This consisted of community organization, vat building, and the voluntary dipping of cattle in order that cattle owners might be convinced of the effectiveness of dipping and the possibility of eradicating ticks by uniform effort. In the

work above outlined 48,089,005 dippings of cattle in arsenical solution were supervised and herd records compiled in the field offices and reported to the department.

DIPPING OF CATTLE.

Mr. ANDERSON. You say there were over 48,000,000 dippings of cattle?

Doctor MOHLER. Yes, sir.

Mr. ANDERSON. How many times did you dip each cow?

Doctor MOHLER. Each animal is dipped every 14 days in a systematic clean-up of a county.

Mr. ANDERSON. For how many times?

Doctor MOHLER. They start in the spring, about the 1st of April; and as the ticks are eradicated, the dipping ceases, usually around the end of September, and sometimes as late as the end of October.

During July and August of the present fiscal year systematic dipping of cattle was conducted in cooperation with State authorities in quarantined counties or parishes in 8 States, as follows: Alabama, 3 counties; Arkansas, 7 counties; Florida, 1 county; Georgia, 15 counties; Louisiana, 3 parishes; Oklahoma, 4 counties; North Carolina, 2 counties; and Texas, 74 counties. The monthly dippings of cattle supervised by Federal, State, or county employees are as follows: July, 9,373,167; and August, 9,740,999.

During the first two months of the present fiscal year final clean-up work was supervised in cooperation with State authorities in 330 counties which had been previously released from quarantine in 10 States and which at the time of their release from quarantine contained one or more herds infested with or exposed to cattle ticks. Control of these herds was undertaken by the State live-stock sanitary officials of the States involved in consideration of the release of the counties from Federal quarantine.

In addition to the systematic work supervised in quarantine areas of the States mentioned and the final clean-up work accomplished in the counties that had been released from quarantine in those States, preliminary educational work was supervised in 25 counties in 5 States. The work was carried on in order that additional areas might be placed in a proper position and attitude to satisfactorily conduct a tick-eradication campaign during the coming year.

During the remainder of the present fiscal year systematic final and clean-up work will continue to be conducted in the areas I have already mentioned.

COOPERATION WITH STATES.

During the fiscal year 1924 it had been contemplated, if the funds remained the same as this year, that systematic tick-eradication work would be supervised in cooperation with State authority in 133 counties in 8 States, as follows: Alabama, 5 counties; Arkansas, 11 counties; Georgia, 8 counties; Louisiana, 9 parishes; North Carolina, 6 counties; Oklahoma, 4 counties; Texas, 84 counties; and Florida, 6 counties. It was estimated that approximately 40,000 square miles of area quarantined for cattle ticks would be placed in condition for release from Federal quarantine during that year.

In addition thereto the final clean-up work would be continued in released areas in cooperation with State authorities. It was estimated that this work would be conducted in approximately 220 released counties containing one or more herds quarantined on account of cattle ticks at the time of their release from quarantine. In approximately 80 counties of this number the work should be entirely completed.

Approximately the same amount of preliminary work will be necessary during the fiscal year 1924 as during 1923 in the States of Arkansas, Florida, Louisiana, North Carolina, and Texas.

Mr. ANDERSON. What proportion of the total area infested has been finally cleaned up?

Doctor MOHLER. With this 29,000 square miles released during the last year we have cleaned up 72 per cent of the original infested area.

Mr. ANDERSON. I judge from your statement that you have to go back and do final clean-up work after you have gone over a county once?

Doctor MOHLER. Yes, sir; we never wait until we kill the last tick to release the county from quarantine. We do that to give encouragement to the earnest men who have dipped every 14 days and have gotten their animals clean. We always have a few "bolshhevists" in each county who refuse to comply with the regulations, and we consider it unfair to the good fellows who have dipped clean to keep them quarantined just because 2 per cent of the stockmen of the county refuse to do the work thoroughly. But we release a county only when the State's officials have signified their willingness to put those infested herds in local quarantine; and they are maintained under the same conditions as if they were under Federal quarantine. We then release the other men that have clean cattle in order that they may go to the free markets without restriction.

Mr. ANDERSON. What is done to clean up these 1 or 2 per cent that remain?

Doctor MOHLER. Sometimes we have to go into court to get those fellows to dip according to State regulations.

Mr. ANDERSON. Then there is authority under the law of the States to require them to do it where they refuse?

Doctor MOHLER. Yes, sir; that is true in all the States where we are working. We do not have any Federal law that would compel them to dip.

DECREASE IN WORK.

Mr. ANDERSON. To what extent will your work be reduced as a result of this decrease in the appropriation?

Doctor MOHLER. It will decrease the work by about 25 per cent of what we are doing this year. We have taken up the work with the various States by zones. We have Texas mapped out into three different zones, Arkansas and Louisiana are mapped out into zones, and the same thing is true in Georgia and Alabama. Our plan was to do a certain amount of systematic dipping work next year, having started educational work in these same counties this year. We always go in to do systematic work one year in the counties where the previous year we had been doing educational work. With this decrease we will be unable to take in any new territory, because the \$500,000 that will be available for next year, according to the proposed bill,

will be needed to clean up the counties we have already prepared. That is the only work that would be possible—to finish the systematic dippings and to mop up the territory in the districts that have been released from quarantine in order to keep the ticks in these individual herds from spreading.

Mr. ANDERSON. Do you mean there will not be any additional work in any new counties under this appropriation?

Doctor MOHLER. There will be very little if any additional new territory included under the \$500,000. It is going to take so much money to work over the territory that has already been released and to do systematic dipping in the counties that are receiving educational assistance at the present time that we can not go into new territory in 1924. We will have to clean up the counties where we are working this year in an educational way.

Mr. ANDERSON. What percentage of the appropriation is used for the new work each year?

Doctor MOHLER. We have never divided the appropriation on a basis of that kind; but you can readily see that we are doing somewhere around 20 per cent educational work in new territory. Then we are doing a little more than that amount of work in systematic intensive eradication and are using the balance of the fund in mopping up in this large number of counties that were released from quarantine during the preceding year or two.

Mr. ANDERSON. I do not just see how that can be. I do not see how it can cost twice as much to mop up the territory that you have been over the preceding year, as it does to do the new work you are doing this year.

Doctor MOHLER. For instance, last year we released, as I stated a few moments ago, 49 counties as the result of the systematic dipping work of 1921, that many counties being released last December. At the same time we were doing "mopping-up" work in 301 counties that had been cleaned up with the exception of a few individual herds in each county, where the States had used their power of local quarantine. Now, we have to use a great deal of care to prevent the infested herds in those particular districts from spreading the ticks to other adjacent districts.

Mr. ANDERSON. I thought you said you left that to the State live stock and sanitary authorities.

Doctor MOHLER. We leave the quarantine to the State authorities. We have our men back there right along to get the last tick. What we leave to the live stock and sanitary authorities is the method of quarantine and the regulations to hold the animals in quarantine. So you see there were 49 of those new counties released, but at the same time we were working in 301 counties after their release from quarantine, because there was some infection left behind. But we have never figured out and never divided up the work so as to know just how much it has cost us to do advance educational work, nor to do the work in the second line trenches where the 14-day systematic dippings occur, nor have we figured out the proportional cost of mopping-up work which is the final work before the territory is entirely cleaned up of the tick.

Mr. ANDERSON. You must have to go back to some of this territory for more than a year, if that is the case.

Doctor MOHLER. Yes, indeed; very often we do. In some cases the ticks have gotten on ponies, and they have spread into released territory as the result of the horses bringing in the infestation.

We had a little outbreak in California—California was released from quarantine about seven years ago, but they got some ticks up there in northern California near Sacramento. There were only 14 herds, but we had to put in men to clean that up, and it took us six months to do it. That is the only time the State of California has been reinfested; and yet in Lower California along the Mexican border there are ticks galore, and it has been a constant source of trouble on our part to keep those ticks below the Mexican border. Somehow, in some way the ticks got into that northern section last year, and we will always have the possibility of a recurrence of the tick in any free territory as long as the tick remains in the South. They come in bedding, in manure, hay, straw, and various different ways that we can not possibly control.

Mr. BUCHANAN. You have a quarantine on the importation of cattle from Mexico?

Doctor MOHLER. Yes, sir; every head of stock imported into this country receives inspection along the border from Brownsville all the way across to San Diego.

Mr. ANDERSON. What I can not get through my mind is, if you have been doing this systematic follow-up work why you still have 300 counties that are partially infested.

Doctor MOHLER. In some counties there are only one or two herds left that are infested, and it requires a great deal more proportional cost to clean up the last few herds in a county than it would a much larger territory of original infestation. It is like 100 per cent efficiency in any line; it is relatively cheaper to bring up any work to the first 70 per cent of efficiency than the last 2 per cent.

Mr. BUCHANAN. When you release the counties do not the State authorities mop up those isolated cases?

Doctor MOHLER. They work with us, but they do not as a rule have the kind of men that we have, who know just the strength of dipping solution required in the vats and are fully informed on the subject in general.

Mr. BUCHANAN. It looks to me as if, with nearly a year of dipping experience, the State men ought to get sufficient knowledge to be able to make the proper solution; and after you make the solution it would seem to be a simple matter.

Doctor MOHLER. That may be, but after you have a thousand head pass through the dipping solution it weakens and you have to have a testing outfit to keep the solution at the proper strength to be effective.

Mr. BUCHANAN. It looks to me that if you had a State man there in the business for eight months in a county he should be able to attend to that mopping-up work.

Mr. ANDERSON. Do you have to keep one man hanging around a herd for eight months?

Doctor MOHLER. Oh, no; we have one man in charge of two or three of these counties. We have only 220 inspectors employed in these 10 or 11 States. The States have 203 and the counties have 1,647 employees, who are practical cow men.

Mr. BUCHANAN. They have one in almost every county?

Doctor MOHLER. The States and counties employ almost 2,000 men, and our inspectors test the vats, supervise the work, and direct the laymen who are reporting to them. These local fellows know the owners of the herds very well, but sometimes they do not find ticks on ticky cattle. Our men are made responsible to see that when a herd is released the last tick has been caught; that is our work. We are making great advancement in Texas; in fact, we have made more advancement in Texas in the last year than we have in the previous five years.

Mr. BUCHANAN. We have a law on the statute books that if they do not dip, suit can be brought against them and they can be fined or put in jail.

Doctor MOHLER. That is true, and some of them have gone to jail, too.

Mr. ANDERSON. Are you going to have to spend \$500,000 a year to keep them clean after you get them cleaned up once?

Doctor MOHLER. That territory has not been cleaned up, Mr. Chairman, as I explained before.

Mr. ANDERSON. Some of it must be. You have been at it for 10 years.

Doctor MOHLER. Some of it is cleaned up. Here is a map that will show you where it is cleaned up. There are hundreds and hundreds of counties in these 15 States that are absolutely tick free. You are probably familiar with this map. But there is always a possibility of reinfesting a cleaned territory.

Mr. BUCHANAN. You have not answered Mr. Anderson's question. When you complete the job, how much of this appropriation will be necessary then?

Doctor MOHLER. When we complete the clean-up?

Mr. BUCHANAN. Yes.

Doctor MOHLER. There will not be any of it required.

Mr. ANDERSON. That time will never come.

Doctor MOHLER. It came with California, Kentucky, Missouri, and Tennessee.

Mr. ANDERSON. If your statement made today is correct, the time will never come.

Doctor MOHLER. We were working in 521 counties last year, and 220 of them were entirely cleaned up, which leaves only 301 for this current year. It certainly has been true with the States that I referred to. All of southern California from Sierra Madre to the coast was infested in 1906, and there has been only one recurrence of the ticks since that time. We think it is only fair to release a territory that is 95 or more per cent clean in order to give some encouragement to the men that have done the wise thing by dipping their cattle properly. The only other thing we could do would be to hold a county in quarantine until 100 per cent of the ticks had been killed, and I do not think any sensible man would believe that is the best policy. It costs more money in proportion to keep inspection on two or three infested herds in a clean area, but that is the only satisfactory and feasible thing to do.

Mr. ANDERSON. If it has cost \$500,000 to clean up 300 counties that you have been over three times—

Doctor MOHLER. No; it has not cost that—

Mr. ANDERSON. It has cost too much money.

Doctor MOHLER. I say it is going to cost \$500,000 for the systematic dipping work and final clean up in the counties already prepared and that we can not take on any new counties in which to do educational work, which work we always plan to do a year before we take up intensive systematic dippings.

Mr. BUCHANAN. In other words, you are going to spend the appropriation in stamping out the tick intensively in certain counties and mopping up in others?

Doctor MOHLER. Yes, sir; it will not do to bite off more than we could masticate.

We will have to stop our advance work and clean up those counties next year which are cooperating with us this year.

Mr. BUCHANAN. You are only cutting off the educational work; that is all?

Doctor MOHLER. Yes, sir.

FOR SCIENTIFIC INVESTIGATIONS IN DISEASES OF ANIMALS.

The next item I will take up is on page 62, "For all necessary expenses for scientific investigations in diseases of animals." This item covers all the investigational work we are doing on animal diseases, investigations of tuberculin, serums, antitoxins, and other products, and remains the same as for the current year. This is the item under which we are also conducting the work on contagious abortion.

Mr. BUCHANAN. Let me ask you if there is such a thing as contagious abortion?

Doctor MOHLER. Yes, sir; that is the item which is referred to here.

Mr. BUCHANAN. How are abortions contagious?

CONTAGIOUS ABORTION OF ANIMALS.

Doctor MOHLER. There is a germ that is the cause of contagious abortion. You can isolate that germ from the afterbirth of a cow and grow it on media and feed it to other cows that are pregnant, and they will abort in four or five months' time. The same disease has now been found to affect pigs. There has been more swine abortion in the last six or eight months than we have ever known before. The same germ that affects cattle has been found in swine, producing the same results, and we are now doing considerable work on swine abortion. We find that the living abortion vaccine that we have been working on for the last two years in seven or eight herds is producing better results than any other method of treatment. We are also using various methods for the management of the herd in getting rid of the infectious material from aborting cows. We now pay less attention to the bull as a carrier, and we are getting very satisfactory results with the combined method of herd management and living abortion vaccination.

Mr. ANDERSON. At the dairy show my attention was directed to a supposed abortion cure invented by a man whose name I do not recall.

Doctor MOHLER. There have been a number of cures advertised for abortion. One man in Wisconsin used to get a dollar for an

8-ounce bottle of fluid. We examined it and found it was 99 per cent water and 1 per cent carbolic acid. He made a great deal of money selling it to the dairy farmers all over the country until the department published the results. The dairy papers took it up, and now his business has ceased.

Mr. BUCHANAN. It did no good at all?

Doctor MOHLER. Not at all.

Mr. ANDERSON. This man I spoke of submitted his proposition to your people, and they declined to inspect it, apparently on the ground that it disturbed your scientific work in some way.

Doctor MOHLER. The only thing I know about the case is that one of our men at the show brought me the advertisement of this fellow, who I understand has a very prominent dairy man in the company with him. What is his name?

Mr. ANDERSON. I think his name is Cushman.

Doctor MOHLER. The information was brought to me from St. Paul as an advertisement, but he has never submitted, as far as I know, any request to have the medicine tested, or anything of that kind. In those kind of cases we always ask for information as to the ingredients. When these manufacturers of medicines submit their samples to us they usually want a testimonial as to their good merits, etc., but we always request that the ingredients be told to us before we make any investigation at all. We get those kind of letters from all over the country, probably two or three a week, claiming cures for tuberculosis, cholera, Texas fever, roup, and abortion. Some of the letters show such illiteracy you can hardly read them, and yet the writers believe they have absolute cures for these various diseases. I do not know the merits of that individual case, Mr. Chairman.

Mr. ANDERSON. I do not know, either.

Doctor MOHLER. Mr. Cushman is a very good dairyman and a very fine business man. I think he is in a bank up there, too.

ERADICATION OF HOG CHOLERA.

The next item is on page 64, "For investigating the disease of hog cholera, and for its control or eradication." This work is being carried on in cooperation with 34 States.

Eighty-one bureau veterinarians devote their entire time to hog cholera field work, and, in addition, the inspectors in charge of bureau work in 23 States devote a part of their time to it, making a total of approximately 91 department veterinarians engaged in hog cholera work in the field this year.

State regulatory authorities, State agricultural colleges, farmers' organizations, live-stock organizations, veterinary practitioners, bankers, pig clubs, live-stock owners, and any other organization or individual interested and willing to assist, cooperate with us in this work.

Bulletins, articles on the diseases, and press notices of outbreaks, public addresses, interviews with farmers in the hog lot, posters, lantern slides and moving pictures, are mediums used in our educational work.

A veterinarian is assigned to a district covering a number of counties. He keeps in close touch with the hog-cholera situation

in his district through contact with farmers, veterinary practitioners, county agents, live-stock markets, reports of bureau inspectors located at packing houses, etc.

DEPARTMENT AND STATE COOPERATION.

The handling of outbreaks of hog cholera is largely left to the department and State field veterinarians. On receipt of a report of an outbreak in his district the field veterinarian proceeds to the farm on which the disease has appeared; he diagnoses the trouble, gives advice in regard to treatment and the disinfection of the premises, traces the source of the outbreak, notifies other hog owners in the neighborhood, and advises them in regard to precautions and the advisability of having their herds immunized, and often assists local veterinarians in immunizing the hogs. In communities where there are no regular veterinary practitioners our field men administer the treatment themselves. Many calls come from veterinarians who desire assistance in diagnosis or advice in regard to technique, and the farmer has come to regard the department veterinarian as a reliable source of information and advice when he is in trouble. The money appropriated for next year will be used to carry on this work along the same lines as at present.

Mr. BUCHANAN. Have you got any vaccine or any character of medicine to be administered to hogs that will make them immune?

PREVENTIVE SERUM.

Doctor MOHLER. Yes, sir. There is a preventive serum that was discovered in the bureau 14 years ago. It is something like the serum that is used for diphtheria in children.

Mr. BUCHANAN. Is it certain?

Doctor MOHLER. Yes, sir.

Mr. BUCHANAN. Established beyond question?

Doctor MOHLER. Absolutely.

Mr. BUCHANAN. And any person can use it on a drove of hogs and make them immune?

Doctor MOHLER. Yes, sir.

Mr. BUCHANAN. And they can not get cholera?

Doctor MOHLER. They can not get the cholera if the serum-virus treatment has been properly applied.

Mr. BUCHANAN. Does it cost much?

Doctor MOHLER. It costs from $1\frac{1}{4}$ cents to 2 cents a cubic centimeter. There are 40 cubic centimeters to a dose for the average-size pig, making the cost about 50 to 80 cents for the serum. In addition farmers usually employ some one to make the injection.

Mr. BUCHANAN. You have to have more than one injection?

Doctor MOHLER. One injection of serum and virus is sufficient for the life of the hog, but, of course, when new pigs are born they have to be injected.

Mr. ANDERSON. What is the total cost—\$2 a head?

Doctor MOHLER. It ought not to average nearly that much, Mr. Chairman. The older the pig is the more expensive it is. When they are little fellows, sucklings of 15 or 20 pounds, they can be vaccinated for 50 cents apiece. That is what we have been trying to get the farmer interested in; instead of waiting until the pigs

weigh 80 or 90 pounds, we are trying to get him to vaccinate them when they are small, and then he will save half of his hog-cholera serum bill.

Mr. ANDERSON. Do they die as a result of the vaccination?

Doctor MOHLER. No, sir. We have vaccinated little pigs which were not more than 10 days old, right into the abdomen—put the needle through the abdominal wall so that the serum would go into the abdominal cavity, and they get down and suckle their mothers without showing any discomfort. We had 270 out at the Beltsville farm this spring, and practically half of them were vaccinated when from 10 to 14 days old. We did not lose one. The inference has gotten out among the hog growers that if they vaccinate a pig before it is weaned it will not remain immune. I do not know how that theory arose, but it is absolutely without any foundation. We tried to disprove that with these baby pigs at Beltsville, and when they got to weigh about 60 to 80 pounds we took them over to Bethesda where we do our hog cholera work. We placed them in contact with virulent hog cholera and we have yet to lose a single animal from this infection, showing they were made immune by being given this vaccination when they were 10 to 14 days old.

Mr. BUCHANAN. What is the name of the preparation.

Doctor MOHLER. Hog cholera serum. You inject 30 to 40 c. c. of hog cholera serum with 2 c. c. of the hog cholera virus.

Mr. BUCHANAN. They use that virus to give them a mild phase of cholera?

Doctor MOHLER. Yes, sir. They are then immune forever.

Mr. ANDERSON. How many men have you got working in the field on the hog cholera proposition?

Doctor MOHLER. Eighty-one men work full time on hog cholera and about 23 work part time. All together it would make about 91 full-time men.

Mr. ANDERSON. You have a reduction of about \$100,000 on that item?

Doctor MOHLER. Yes, sir; \$103,980.

REDUCTION IN APPROPRIATION.

Mr. ANDERSON. Will you be able to take care of the work with that reduction?

Doctor MOHLER. Not on the scale that we are doing the work at the present time, but what I plan to do is to reduce the force in these outlying States, like Michigan, Georgia, and Florida, and up in Montana, Washington, Idaho, and California. Instead of continuing 4 men in Texas and 4 men in Kentucky, we will reduce the number there and concentrate the work on hog cholera in the Corn Belt States, where 50 per cent of the hogs are being produced.

Mr. ANDERSON. Is this being carried on on an eradication basis?

Doctor MOHLER. No, sir.

Mr. ANDERSON. You are simply taking care of the districts where hat occurs?

Doctor MOHLER. Yes; in various sections. Our men are located in different sections and they are sent to the farms where the disease occurs.

Mr. ANDERSON. Are cases pretty promptly reported?

Doctor MOHLER. Yes, sir. We get very good results. Over in Maryland we have had probably 30 or 40 outbreaks in the last three months, and the disease never spread from the farms where the outbreaks occurred. In Michigan there has been a little more cholera this last fall than they had last spring; but in Iowa and Nebraska the conditions are much better. It varies; sometimes you will find it better in one State this year than it was last year, and in others you will find that it was better last year than it is this year. But we are not losing to-day anything like what we did 10 years ago on account of hog cholera. Year before last the death rate was reduced to 38 hogs per thousand. Last year it reached 43 per thousand, but that was on account of the financial situation of the farmer last fall.

Mr. ANDERSON. You mean 43 hogs per thousand infected?

Doctor MOHLER. No; per thousand head of hogs in the country.

Mr. ANDERSON. That is pretty high.

Doctor MOHLER. It has been as high as 130 before this hog cholera serum was used 10 years ago; but the reason for the increase last fall was on account of the fact that the farmer's financial condition prevented him from spending any money on serum. He let his hogs die because he did not have enough money to pay for their treatment.

Mr. BUCHANAN. For hog cholera you give them one dose of hog cholera serum and 2 cubic centimeters of virus; is that it?

Doctor MOHLER. Yes, sir. We have done that in hundreds of cases. Of course if the hogs are sick with cholera before treatment they are going to die.

Mr. BUCHANAN. I mean for those that are well?

Doctor MOHLER. Yes, sir. We have on numerous occasions allowed a number of exposed hogs to remain untreated and an equal number to be treated, and you could readily see the difference. The untreated hogs would die, while the treated hogs remained well.

Mr. BUCHANAN. It is a pretty effective serum, then?

Doctor MOHLER. Yes, sir.

Mr. ANDERSON. Have you any figures, Doctor Mohler, indicating what the States are spending, and giving the number of men they have employed in this cholera business?

Doctor MOHLER. They are spending less than \$200,000 a year, and the number of men varies. They have a hog cholera program, which is in conformity with our program. If an outbreak occurs they draw on the men from some other line of work, if they have no regular cholera men. The following table contains this information by States:

Cooperation of States with the Bureau of Animal Industry in hog-cholera control work.

| Names of States. | Approximate number of men employed. | Approximate amount of money expended. | Names of States. | Approximate number of men employed. | Approximate amount of money expended. |
|------------------|-------------------------------------|---------------------------------------|---------------------|-------------------------------------|---------------------------------------|
| Alabama..... | 2 | \$5,000 | Mississippi..... | 1 | \$2,500 |
| Arkansas..... | 3 | 5,500 | Missouri..... | 2 | 4,000 |
| California..... | 2 | 4,000 | Nebraska..... | 2 | 4,000 |
| Colorado..... | 1 | 2,000 | New Mexico..... | 1 | 2,400 |
| Delaware..... | 1 | 3,500 | North Carolina..... | 2 | 4,500 |
| Florida..... | 6 | 21,760 | North Dakota..... | 1 | 1,000 |
| Georgia..... | 7 | 20,000 | Ohio..... | 2 | 4,500 |
| Idaho..... | 1 | 2,000 | Oklahoma..... | 2 | 9,000 |
| Illinois..... | 2 | 5,000 | South Carolina..... | 11 | 25,000 |
| Indiana..... | 3 | 12,500 | Tennessee..... | 2 | 4,500 |
| Iowa..... | 2 | 4,000 | Texas..... | 2 | 4,000 |
| Kansas..... | 2 | 3,000 | Virginia..... | 2 | 3,000 |
| Kentucky..... | 2 | 4,000 | West Virginia..... | 1 | 1,500 |
| Louisiana..... | 2 | 25,000 | Wisconsin..... | 2 | 4,712 |
| Maryland..... | 1 | 2,000 | | | |
| Michigan..... | 1 | 2,000 | | | |
| | | | | 71 | 195,872 |

Some States produce antihog-cholera serum, while others purchase it and sell it to farmers at actual cost, including handling.

COMPLETE ERADICATION OF HOG CHOLERA.

Mr. ANDERSON. You did some eradication work in Texas at one time. Did that contemplate the possibility of complete eradication of hog cholera?

Doctor MOHLER. No, sir. I do not think complete eradication is possible under present conditions. I think the cost of completely eradicating hog cholera would be so immense under present conditions that it would be extravagance to try it. It would cost a great deal more than probably would be appropriated. The thing to do, I believe, is what we are doing—stop the infection where it originates, and keep it from spreading all over the country. Eight or ten years ago when an outbreak occurred on one farm it spread to the whole community until a snowstorm or some change of weather conditions killed it off or it burnt itself out; but to-day a farmer may have hog cholera on his farm and it will be kept from spreading to his neighbors.

Mr. ANDERSON. Is it transmitted by people carrying it on their shoes?

Doctor MOHLER. Yes; it is not nearly as infectious as the foot-and-mouth disease, but it is carried in the same way by birds, pigeons, and dogs, on farmer's boots and clothing, and it is also carried by the wheels of automobiles from an infected farm to other sections. It is very easily disseminated.

Mr. ANDERSON. You have to disinfect the premises where it occurs?

Doctor MOHLER. Yes. That is one essential thing. Our inspectors do not do that, but they supervise the work and tell the owners how to do a good job. That is the reason our men are so valuable, because they cover large territories giving advice and supervising the control of the disease.

EXTENSION WORK.

Last year with a hog cholera force of 80 veterinarians, there were held 1,074 meetings with an attendance of 67,408; 4,343 demonstrations in the use of the preventive serum treatment were made, with an attendance of 26,428. At these demonstrations 88,846 hogs were treated, 47,137 investigations of swine disease were made, 1,401 infected premises were quarantined, and 439 premises cleaned and disinfected. There were 171,325 interviews held concerning hog-cholera prevention and control. In efforts to assist practicing veterinarians and improve their methods and technique, 36,787 hogs were treated, and, in sections where veterinary service was not available, 246 laymen were trained to apply the serum treatment.

With reference to your earlier query, this decrease in the appropriation for hog cholera, to my mind, is not going to be nearly so harmful to the work as the decrease in the tick-eradication fund will be to that work. I think we can get along far better than in the latter case, where the eradication methods have been perfected in such a way that you can clean the whole county or the whole State, for with Texas fever we have an absolute and uniform method of getting rid of ticks. Unlike with hog-cholera germs, we have an absolute knowledge of the life history of the tick and its vulnerable points, by which we can clean up county after county and State after State, thus getting rid of this very heavy burden on the live-stock industry of those counties and States. So there is no comparison, in my mind, between the effect of a decrease in hog-cholera funds and a decrease in tick-eradication money on the live-stock industry, not only of the South but the North, East, and West. We are taking feeder cattle from the South constantly and there are going to be all kinds of unrestricted movements of cattle between the North and South when the quarantine line has been shoved into the Gulf.

We had a case up in Pennsylvania the other day where ticks were brought in with southern cattle, the ticks being so small when they left the South that you would have to have a magnifying glass to see them, but when the animals got up North for slaughter the inspector found the ticks. During the time these cattle were on the railroad car the ticks had grown big enough to be seen on reaching Pennsylvania. So that there will always be danger of spreading ticks from the South to the North so long as there is a single tick remaining in that section.

Mr. BUCHANAN. You can feel them, all right.

Doctor MOHLER. Yes; that is true.

Mr. BUCHANAN. How many little ticks can come from the blood of one tick?

Doctor MOHLER. Anywhere from 3,000 to 4,000 eggs are laid at one time by one female through her oviduct, as with poultry. These eggs later hatch and produce the minute seed ticks, which subsequently become attached to the bodies of cattle.

FOR ERADICATION OF DOURINE AMONG HORSES.

Mr. ANDERSON. We will now take up the item on page 66, "For all necessary expenses for the investigation, treatment, and eradication of dourine."

Mr. BUCHANAN. I would like to inquire as to what that is?

PROGRESS OF WORK.

Doctor MOHLER. Dourine is an infectious disease affecting breeding horses, and is similar to syphilis in man. Continued progress is being made toward the final elimination of this disease. A new outbreak in South Dakota, involving about 2,000 animals, was the most unfavorable development of the year. A considerable number of diseased animals are still found on Indian reservations in Arizona, but even there the number of such animals is being gradually reduced. The work in Arizona has not progressed very rapidly owing to the difficulty experienced by the Office of Indian Affairs in securing the prompt slaughter of diseased animals. It is understood that this difficulty was due, in part at least, to insufficient funds to indemnify the Indians owning diseased animals. Out of 14,549 horses examined only 243, or 1.6 per cent, were found infected and were killed.

This, Mr. Chairman, you will remember, is the same trouble that occurred last year. It is difficult to get the Indians to carry out instructions from the Office of Indians Affairs.

Mr. BUCHANAN. So you just kill them when you find them?

Doctor MOHLER. Yes, sir. That is the only way to stamp out the disease.

Mr. BUCHANAN. It is like the kindred disease in the human family?

Doctor MOHLER. Yes, sir; it is.

Mr. BUCHANAN. You can not cure it?

Doctor MOHLER. No.

Mr. BUCHANAN. Is there any 606 for horses?

Doctor MOHLER. Yes; but these horses are worth only \$35 or so apiece, and while 606 might probably cure them, it is too expensive.

Mr. ANDERSON. Are we going to get rid of this finally?

Doctor MOHLER. I expect, Mr. Chairman, that this disease will be entirely cleaned up in two years' time. Last year I said three years, and one year has passed, so I have reduced it to two years.

Mr. ANDERSON. You are still insistent?

Doctor MOHLER. Yes, sir.

CONSTRUCTION WORK AT BELTSVILLE, MD.

The next item, the one that occurs on page 67, will be discussed by Doctor Larson, regarding the Beltsville dairy barn construction.

MEAT INSPECTION.

The next item is for meat inspection, on page 69. This is the large work of meat inspection that is being carried out by the department under the 1906 law. There is a proposed decrease next year of \$25,000, and we will have to absorb that in our overhead.

NUMBER OF CATTLE SLAUGHTERED.

Mr. ANDERSON. How does the slaughter this last year compare with prior years?

Doctor MOHLER. The slaughter of last year was 1.3 per cent greater than the year before, but this year the slaughter is going to be greater

by far than any year we have had, except 1919, when we killed 70,000,000 live stock.

Mr. ANDERSON. The packers say they are all running below capacity and that the consumption is away down. How can you account for this increased slaughter in the face of the lower consumption?

Doctor MOHLER. The only way I can account for it is that our increasing population is taking care of the increased slaughter, although the per capita consumption has decreased. This last year the slaughter totaled 63,000,000 animals, and that is about 1.3 more than the 1921 slaughter. In June, July, and August of 1922 the slaughter of hogs was much higher than during the same months of any preceding year. There are more hogs in the country now than there have been for several years, and the packers are slaughtering them, and also cattle, rather fast just now. So with the prospects of increased slaughter we are going to be handicapped by the decreased appropriation for 1924.

PAYMENT FOR OVERTIME SERVICES.

Mr. ANDERSON. I have a sort of nebulous recollection of some legislation we passed, under which the packers paid overtime for part of this inspection.

Doctor MOHLER. Yes; that is very true. That was in the year 1919. By this bill the overtime of the meat inspectors is defrayed by the packers, who give their checks to the Secretary of Agriculture, and he in turn pays the inspectors who work overtime. The inspectors are paid at the rate of one and one-half the regular pay for week days and double pay for holidays and Sundays.

Mr. ANDERSON. Did that only apply for that year?

Doctor MOHLER. No, sir; that has been for every year since.

Mr. ANDERSON. That is still in effect?

Doctor MOHLER. That is still in effect.

Mr. ANDERSON. How much was paid by the packers under that last year?

Doctor MOHLER. About \$216,000.

Mr. ANDERSON. There will be as much as that or more this year?

Doctor MOHLER. It will be a little more than that, because there is more killing being done this fall, and there will be more this winter than there has been for several years past.

Mr. JUMP. According to my understanding of the matter, the present plan is that in a short time the department will work up an estimate based upon such realignment of forces in the meat-inspection force as Doctor Mohler can bring about, to be submitted through the Budget Bureau as a supplemental estimate, to cover the time beginning with the next fiscal year, of the money necessary to employ the additional employees that might be required in the meat inspection so as to do away with that overtime, and thus accomplish the same thing contemplated by the bill. We are not in position to make that estimate yet, but there will be something later.

Doctor MOHLER. If this bill were reintroduced, passed, and signed by the President, it would mean that from that date until the 30th of June our men would have to work overtime and get no pay for it, unless we could get some remedial legislation passed.

Mr. ANDERSON. They get time and a half on week days and double time on Sundays?

Doctor MOHLER. Yes, sir.

Mr. ANDERSON. Somebody would save some money if they did not have to do that.

Doctor MOHLER. The packers would, you mean?

Mr. ANDERSON. Yes.

Doctor MOHLER. Yes, sir.

Mr. ANDERSON. It would be a saving. It must cost considerable money to do this on the basis of overtime. Do you get your regular employees to work for regular wages on Sunday?

Doctor MOHLER. No; not at present.

Mr. ANDERSON. So you would not save anything on Sunday work would you?

Doctor MOHLER. In case we paid overtime, you mean?

Mr. ANDERSON. Yes.

Doctor MOHLER. I figure that if we paid for the extra work we could get along with about \$180,000 instead of \$210,000 that the packers pay, because the Government does not pay double time on Sunday or one and a half time for regular day work. We would employ a man at so much a month, and if the packing house was occasionally opened on Sunday he would have to be there, so it would cost the Government less than it is costing the packers; but I do not believe that it is advisable to change the overtime law until Congress provides otherwise for the extra work. When the law was passed the packers had to pay for all the overtime, and at first the men worked many extra hours, but later, with reduction in killing, they doubled up and were paid less overtime. The packing-house business decreased from 70,000,000 animals slaughtered in 1919 to 65,000,000 in 1920, 62,000,000 in 1921, and 63,000,000 in 1922, so that our men have done a great deal less overtime in the last 12 months than they did at the beginning.

Mr. BUCHANAN. Suppose this law was repealed and the department had to supply its labor, would you supply it by means of overtime or by new employees?

Doctor MOHLER. Largely with new employees.

Mr. ANDERSON. Then your employees would probably cost you as much as time and a half and overtime, because you would have them on the rolls all the time, and these others would have just a little overtime?

Doctor MOHLER. But many of the meat-inspection men who work so hard during the heavy slaughter in wintertime are taken off the inspection work in the spring and go out and work on ticks, cholera, tuberculosis, scabies, and other seasonal work. We would not have that peak load to carry throughout the four seasons.

Mr. ANDERSON. What I am trying to get at is whether it is most economical when you have a little overtime and pay an employee that extra, or whether it would be more economical to have more employees?

Doctor MOHLER. In such a case it would be economy to pay extra for that overtime. We always have a regular, normal force and we would expect them to do a little overtime in emergencies without extra pay. It is not a question of a little or occasional overtime, but where the inspectors work long hours, starting at 7 in the morning and working until 5 or 6 or even later at night, in the large packing centers during January, February, and December, we would like to take care of them either by the overtime provision or by relief employees.

Mr. ANDERSON. Does that complete your item, Doctor Mohler?

ERADICATION OF FOOT-AND-MOUTH DISEASE.

Doctor MOHLER. There is one more item on page 329, for foot-and-mouth disease, which has been referred to. The assignment of experienced veterinary inspectors at public stock yards to make careful inspections for symptoms of this disease is being continued. Suspected cases of animals in any way resembling foot-and-mouth disease, reported as affecting susceptible animals anywhere in the country, are promptly investigated by veterinary inspectors who are familiar with the symptoms of this disease.

At the present time when live stock is being moved from one country to another outside the usual channels of trade and foot-and-mouth disease is appearing in countries formerly free of the disease, it is most important that extra precautions be taken to guard against the introduction of this disease into the United States or to detect the disease in the event it should obtain entrance into this country. Under this project an average of about \$3,500 a month is being expended, largely to pay the salaries of the veterinary inspectors referred to above at public stock yards.

Last August a disease having certain characteristics of foot-and-mouth disease was reported in the Island of Jamaica. We do not know how it got in there, but we found out through one of the reports of the consul at Kingston that they had a peculiar disease which they called calf diphtheria in several of their Provinces, and we surmised it was the foot-and-mouth disease. We traced shipments of material from Jamaica into this country and found at that very time there were three or four hundred hides and several bales of sheep and goat skins on the docks at New York. In order to prevent any infection being brought into this country we ordered the whole cargo back to Jamaica, disinfected the docks at New York City, and ordered an embargo on similar shipments. Later on, during October, we learned that the disease had finally been diagnosed as foot-and-mouth disease by the Jamaican authorities. That just shows how close a country can come to being exposed to an outbreak of foot-and-mouth disease and yet escape.

TUESDAY, NOVEMBER 21, 1922.

NECESSARY EXPENSES FOR INVESTIGATIONS AND EXPERIMENTS IN DAIRY INDUSTRY.

STATEMENT OF DR. C. W. LARSON, CHIEF OF THE DAIRY DIVISION.

Mr. ANDERSON. We will now take up your first item on page 58, "Necessary expenses for investigations and experiments in dairy industry," etc.

Doctor LARSON. Mr. Chairman, the work of the dairy division is planned along the same general line as has been going on this past year. The appropriations are the same, and the program is the same. The work is divided into three general classes: Investigations of the production of milk; second, the manufacture of products of milk; and third, the introduction in the States of the results of these investigations.

LINES OF PRODUCTION.

Under the head of production our work is along three lines: First, nutrition; second, breeding; and third, herd management.

In the nutrition work we have made splendid progress during the past year, especially in studies along the line of mineral requirements of dairy cows. It has been found that the old standards of feeding, which have included the fat, proteins, and carbohydrates, do not satisfy milk production. It has also been found that animals may not lose in weight and may not immediately go down in milk production, but we know that some change has taken place, so that even in the next lactation period there may be a very great reduction in milk, and for this study it is necessary not only to know the milk produced but to make thorough digestion trials, and for this special equipment is necessary. We have the organization for doing this work. We have a splendid corps of investigators and we are especially anxious to have a place in which we can carry on this nutrition work.

BREEDING OF ANIMALS.

Mr. ANDERSON. Is this nutrition work carried on at Beltsville?

Doctor LARSON. Yes, sir.

Mr. ANDERSON. Is that carried along with breeding animals?

Doctor LARSON. As far as it can be. In the breeding work we are now on our third generation of animals, in which we are attempting to establish some definite basis of improvement of our cattle. There is no known process of breeding that we know will produce animals of high production and do it uniformly. We have spurts of high production, but it has never been uniform, and we have various theories and we are trying to work out some principles on which we can improve our cattle.

Mr. ANDERSON. I think there you have three kinds of breeding?

Doctor LARSON. Yes, sir. We have the comparison of line breeding with outcrossing; second, comparison of inbreeding with outcrossing, and third, the breeding of a pure strain of high production by continuous use generation after generation of sires that have proven

ability for high production. In other words, we believe that it is possible to use sires that have been proven as producers of a large number of animals of high production, and concentrate that ability. We also have a fourth, in which we are attempting to prove or disprove what is known as the "nicking" theory, by combining blood of eight distinct families.

Mr. ANDERSON. What is the theory?

Doctor LARSON. The theory, which is practiced by most of our breeders, is that unless you use animals that are fairly closely related there is danger of reducing the production of the family. That is the general practice throughout the country in buying a sire, to buy one that is fairly closely related, or that carries some of the same blood, and not get blood that is from distinctly different families. In the Jersey breeding we have at least eight distinct prominent families, and we are mating those in a way that will make it possible to bring together in the third generation animals with the blood lines of these eight distinct families in equal proportions. In each generation we can compare these outcrossed animals with the animals that are bred within the families and determine whether the "nicking" theory holds good.

Mr. BUCHANAN. You mean eight related families?

Doctor LARSON. Eight unrelated families that are distinctive families in themselves.

Mr. BUCHANAN. Of the same stock?

Doctor LARSON. Of the same breed. This work will take considerable time, but we think that it is fundamental and will be very useful throughout the whole country. It is a project that a State or a breeder could not undertake. With our dairy cattle producing a product that last year had a farm value of \$2,400,000,000, and the efficiency of the cows that produce that product depending largely upon their inheritance for large production, we believe that these experiments should be carried out to establish methods of breeding whereby the inheritance for large milk and butter-fat production can be transmitted with greater uniformity.

INCREASED PRODUCTION THROUGH SCIENTIFIC MANAGEMENT.

In the management work it has been shown that by extra methods of care and feeding animals it is possible to increase production 60 per cent. We have now kept a number of animals four years. The first year we kept them under ordinary farm conditions; the year after that we kept them under what we call advanced registry conditions, or special care, and the third year we put them back to general farm conditions, and the fourth year into the advanced registry conditions, and we have been able to increase them as much as 60 per cent on the average. Now we are undertaking to determine which one of the steps in the different care contributes the most and how much each step contributes to this increase.

Mr. ANDERSON. What is the different care given?

Doctor LARSON. The general farm treatment includes keeping the cow in the ordinary stanchion, feeding her the ordinary feeding standard requirement, and milking twice a day. The advanced registry conditions include keeping the cow in a box stall, feeding her

three times a day and milking her three times a day, and, in case her production is above 75 pounds a day, milking her four times a day.

Mr. ANDERSON. How does the added production compare with the increased cost of maintenance on the advanced registry basis?

Doctor LARSON. We are studying each of these steps to determine the amount of increase, as well as the net cost. We have gone far enough to say that in the East, where straw is relatively expensive, the additional bedding required in the box stall and the labor involved in putting it there and taking it away just about balances for the increased production. The box stall, therefore, is not an economical proposition with us in the East.

With feed under the condition of prices that prevails in Maryland, where we have this farm, and with the price of milk obtaining here in the East, it is profitable to feed the additional feed that was given under the advanced registry over general farm conditions. We compared those figures, however, with conditions in one of the western farms, and it was not economical, because the additional milk did not pay for the additional feed used. So that the feed proposition depends upon the price of feed and the market, and there are all gradations down, depending upon the price of milk and feed.

In a similar manner we are studying the various other problems of management.

Mr. ANDERSON. That seems to me rather out of line; an increased production of 60 per cent, it seems to me, ought to pay for a good deal of additional feed, unless the cow was starved to death first.

Doctor LARSON. It does pay for a good deal of feed.

Mr. ANDERSON. I can not see, if the additional feed produces 60 per cent, that you would not make any money on the initial production of the cow.

Doctor LARSON. It is not only the feed that is necessary to get the 60 per cent; I said, the box stall, the milking three times, and sometimes four times a day, and feeding three times a day. In the case of milking we found that with cows producing a fairly good amount of milk, there was considerable profit in milking three times a day over two times. The increase in milk paid for the additional work and left some balance.

Mr. ANDERSON. In determining these costs, how do you get at them, all on the basis of paid labor?

Doctor LARSON. Oh, yes.

Mr. ANDERSON. It would not necessarily follow that the farmer who was running his own farm and not employing labor, could not use a little extra energy and milk his cow three times a day and use the extra feed required to increase production?

Doctor LARSON. No; but these results are stated in terms of unit requirements; in other words, so many hours or minutes of labor during the month, and the farmer can decide for himself whether or not he will do that for 10 cents an hour or 15 cents an hour or 20, depending upon the prices he would have to work for in order to get this return. The same is true of feed. That is given in terms of units and not dollars, so that he can convert to his own conditions.

Mr. ANDERSON. There is a good deal of possibility of being misled in this matter?

Doctor LARSON. There is; but recently we had at the farm a dozen of the leading dairymen of this country, and this management work was explained to them and they were intensely pleased with it, and are putting it into practice, much of it. Not only is it positive, but we have negative results as well. In other words, people assume that if you put a cow in a box stall you get more milk, and some people are remodeling their barns on the basis of that. It is shown that it is not economical to do that, but people will do it where they want to get a high production for advanced registry records.

Mr. ANDERSON. Of course, that is a part of the breeding and selling proposition?

CONDUCT OF IMPORTANT LABORATORY EXPERIMENTS.

Doctor LARSON. Yes, sir. In the laboratories we are working with various products of milk, including ice cream and cheeses of various kinds, condensed and evaporated milk, and also the milk itself for direct consumption. One of the important products in connection with this is the manufacture of foreign varieties of cheese. Normally we have been importing as much as 60,000,000 pounds of cheese, while we only manufactured 300,000,000, and this cheese that has been imported is of a kind and varieties that sell at the highest prices; and in these laboratories they have perfected a method of making some of these varieties as well as they are made in the foreign countries.

Mr. ANDERSON. Is it possible to find experienced cheese makers in this country, plenty of them?

SCARCITY OF EXPERIENCED MEN—CHEESE INDUSTRY.

Doctor LARSON. No, sir; especially not men who know how to make use of these improved methods.

Mr. ANDERSON. I have come across one or two cases in my travels around the country where there appear to have been failures of cheese factories, due largely to the fact that the people operating them did not seem to have the experience necessary to carry on the business successfully, and I thought that there really was not an adequate supply of experienced cheese makers in the country.

Doctor LARSON. No; I will say there were not, and especially men who could make the foreign varieties.

Mr. ANDERSON. Do they require any particular quality of milk?

Doctor LARSON. Yes; that is true especially of Swiss cheese. The other varieties do not.

Mr. ANDERSON. They require a higher butter content, or what?

Doctor LARSON. No; most of them require a low butter content. Swiss cheese is usually partly skimmed from the normal milk. In fact, you can not make Swiss cheese from the average milk in this country, because it is too rich. As far as butter fat content goes, that can be taken care of, with any of these products. Swiss cheese, however, requires a particular organism that will develop the eyes and the particular flavor that goes with it, and the laboratories of the dairy division have isolated the organism that produces the eyes and the flavor, and by the use of that organism they are able to change the making of Swiss cheese from an art into a science. Up to this time and at the present time in most of the Swiss cheese factories

in this country it is entirely an art, and the results are uncertain. For every hundred pounds of Swiss cheese you buy you must pay for a certain number of pounds that are destroyed that do not come out. You must pay for a certain other number of pounds that are sold below the cost of production, and probably in this country not over 60 per cent of the Swiss cheese is of high quality. But by the use of this organism they are able to get as high as 80, and in some cases 90 per cent of high quality Swiss cheese.

Mr. ANDERSON. Where does the dairyman go now to learn cheese making?

Doctor LARSON. The colleges, a few of them, are teaching cheese making. I can say in connection with this particular work that we have what is known as the introduction section. The introduction section of the dairy division is working to put the results of these investigations into the hands of the manufacturers, and it does it in this way: They make Swiss cheese, or any other variety. There are several varieties of Italian cheese that sell at the highest price, which we are now making in the laboratories. After we have gone far enough to be satisfied that we can make a particular product we go to Grove City, where we have a factory under our control, and we manufacture that product on a commercial scale; and when we have done that we invite the manufacturers to come there and send their cheese makers there, where they can get all the information we have about the product.

Mr. ANDERSON. How long do they have to stay there to learn it right?

Doctor LARSON. For one variety it would not take very long. If they are good cheese makers to start with and are willing to change from their old methods, in two or three months the men can get in shape to make it very satisfactorily. We carry that on in this way; for instance, the State of Wisconsin makes most of the Swiss cheese, and they say, "Well, now, we would like to make that cheese, to make a better product," and so we enter into an arrangement of this kind. We say to the State of Wisconsin, "We will put a man in there for one year or two years to work in five factories, not more. You put a man there to go along with this work, and at the end of that time if we have demonstrated by those four or five factories that this is the proper method, then you take it up and extend it throughout the State."

UTILIZATION OF MILK AND BY-PRODUCTS.

The work of the laboratories also takes up the matter of the utilization of milk and the by-products. We have an enormous quantity of by-products from our creameries and cheese factories, which are not now well utilized. An example of what was done in this: In the past year the men in the laboratories have made a product known as soluble albumen. This has never been made before, and has met with considerable favor by manufacturers. This product is made from whey at cheese factories.

Mr. ANDERSON. What is it used in?

Doctor LARSON. It is used in various food products, some of which we do not know as yet; but it is used where albumen is needed. Persons suffering with certain diseases require albumen foods, and

we are preparing foods for such persons and using this product, and are using it in prepared flours and things of that sort used for cooking. In other words, we are trying to utilize more products and make them available.

Mr. ANDERSON. I noticed you have some extension items on the question of cow-testing and bull-association work.

Doctor LARSON. Yes, sir.

Mr. ANDERSON. What relation does that have to the general extension work?

EXTENSION WORK—COW TESTING AND BULL ASSOCIATIONS.

Doctor LARSON. This cow-testing and bull-association work we have been doing differs from general extension work in that we do not extend the regular association work in the States except so far as to show the people of the State how this work can be done. In other words, in your neighborhood recently the county agent was not sold to the idea of a bull association. We think that is one of the best and cheapest and surest ways of improving the general cattle of this country—through the bull-association work, so our man who is in the bull-association work goes to your State extension man and goes around the county and arranges a survey of the county and calls on a number of the farmers and he finds that they are interested in establishing a bull association. This county agent did not know the constitution and by-laws. He did not know the difficulties of organization and keeping it going afterwards, but the department man worked with this man long enough to establish an association. He may do it in some other part of the State.

Mr. ANDERSON. Do they not have people in the State colleges who do that?

Doctor LARSON. They do after you have shown them how. In other words, we have men who study bull association work, make it a special study for a year or two. A college man, if he were going to drop all of his other work for a year, as would be necessary to learn all the ins and outs of the bull association work, could do it, but he has something else to do, and our man establishes one or two associations and goes to some other State. That is the line he is doing—not to extend it all over the State as the extension work used to be. It is simply showing the way and letting the State do the rest.

Mr. ANDERSON. This fellow operates as a specialist, as I understand?

CONSTRUCTION OF DAIRY BARN.

ANIMAL NUTRITION WORK.

Doctor LARSON. Absolutely. I briefly outlined the work we are doing in nutrition. This is fundamental work in animal nutrition, and it is not simply feeding animals in the ordinary sense of the word, but it is actually determining as far as possible just what becomes of these feeds and what are the precursors to milk. We also study the blood.

They are discovering proteins, for instance, that are more valuable than others for milk production. You may take a feed and analyze it and find it contains a certain percentage of protein, and take another

one and find that it contains the same amount by analysis, but you will not obtain the same results, because this different protein has various amounts of amino acids in it, and results seriously on the milk. We have found that some of these proteins are necessary in some parts of the milk, and in one circulation of the blood as much as 30 per cent of some these are taken out; in other words, in passing through the udder. We are satisfied that some of these factors are limiting the production of our animals. I also said that it is necessary to get a balance of the feeds. It is not simply a problem of determining the amount of milk you get out of a cow to-day, but over a period of time throughout the year. On simply the record of the milk production for a lactation period it is impossible, we find, to take that and learn what she is going to do the next period. We have, therefore, started what we call digestion trials in which we analyze the feed, the milk, and the urine and feces, and in that way we can get a definite idea as to what is happening to the feed and milk during this digestion period. While we are making these careful tests, it is necessary that the cows be kept away from the herd. Our barns now are used for breeding barns and we have no places for this nutrition work.

Mr. ANDERSON. Will you have to buy animals for this work?

Doctor LARSON. No, sir; we have our animals increasing in our breeding herds, and we will not require additional animals for nutrition work.

INCREASE IN HERD.

Mr. ANDERSON. How much has your herd increased in the last four or five years?

Doctor LARSON. In the herd at Beltsville we have increased, perhaps, in the last four or five years, from 80 to 150.

Mr. ANDERSON. Do you sell any of those animals at all?

Doctor LARSON. Up to this time only those that have become sterile or unfit—unproductive. Up to this year the foundation stock of the breeding herd—many of them will have completed their records. We have gotten the measure of the foundation animals—that is, we know what they will produce, and we have their sons and daughters, so that we can dispose of those animals. We feel the work in animal nutrition is going to be handicapped very materially unless we can get a building for it.

Mr. ANDERSON. \$20,000 ought to build——

NEED FOR LABORATORY BUILDING.

Doctor LARSON (interposing). It is not an ordinary barn; it is a laboratory. It is the nutrition building, with places for the cattle, special stalls and devices for making these tests, and the laboratory rooms for mixing the samples and storing them. This is very intricate work. We have to be sure we are using the same feed, for instance, throughout a whole period. That means that that feed is all mixed carefully in thousands of pounds and put away carefully, and the same way with the hay and other mixed feeds.

Then the urine and feces are collected carefully and mixed and sampled, all requiring safe and special treatment. We have hundreds of

samples and necessary equipment along with it that will be handled in this building.

Mr. ANDERSON. If you go into this, you will require quite a large number of additional men too, I suppose?

Doctor LARSON. No, sir; those have largely been provided for already. I hope eventually we shall—

Mr. ANDERSON (interposing). I am skeptical about putting any more buildings on this Beltsville place.

Doctor LARSON. Well, sir, this is a laboratory I feel of importance—to learn the methods of feeding dairy cows—justifying the \$20,000.

Mr. BUCHANAN. How many acres are there in that place?

Doctor LARSON. There are 160 acres, about; and we are renting 129.

Mr. BUCHANAN. One hundred and sixty acres owned by the Government?

Doctor LARSON. Yes, sir. That is one of the dairy farms, approximately that.

Mr. ANDERSON. You have got \$150,000 worth of buildings on it now?

Doctor LARSON. No; we have only spent about half that amount. I think we have very simple permanent buildings. Nothing elaborate.

Doctor MOHLER. The farm has increased 100 per cent in value since we purchased it. It has been a money-making proposition—no doubt of it.

Mr. ANDERSON. I should think it would be from the amount of money you have put on it.

Doctor LARSON. I think the results pay for it.

Mr. ANDERSON. I think it is about the poorest land I ever saw.

EXPERIMENTAL FARM SELF-SUSTAINING.

Doctor LARSON. Part of it is poor, but we are raising very satisfactory crops on it now and have been for several years, and I may say, so far as the farm is concerned, that every year for the last several years the farm itself has been self-sustaining.

Mr. ANDERSON. Do you mean you are raising enough stuff to feed the cattle?

Doctor LARSON. No, sir; I mean we are raising enough stuff to pay for the cost of producing the feed and running the farm. I mean the farm itself.

Mr. ANDERSON. If you are doing that, you are doing very well with what you have got.

Doctor LARSON. I think we are.

Mr. BUCHANAN. He is just holding his own—not making anything or not losing anything, but just standing there.

Doctor LARSON. That is right, and, as Mr. Anderson says, that is very good.

Mr. ANDERSON. How big is this barn going to be, Doctor Larson?

Doctor LARSON. It is going to be a two-story concrete barn with basement and one wing.

Mr. ANDERSON. Fire-proof roof?

Doctor LARSON. No, sir, not a fireproof roof but it will be ceiled inside so that it will be fairly fireproof.

Mr. BUCHANAN. Ceiled with wood or lumber?

Doctor LARSON. Usually we use metal laths and plaster. This barn will provide feed storage also.

Mr. ANDERSON. Does the \$20,000 include the equipment?

Doctor LARSON. Well, there will not be very much equipment required—just the building.

Mr. ANDERSON. If you are going to keep all your animals there and you are going to keep all your equipment necessary to collect the urine and feces you have got to have some other equipment, have you not?

Doctor LARSON. We hope to take care of that out of our regular farm funds.

Mr. ANDERSON. How many animals will there be in this milk test?

Doctor LARSON. There will be about 24 in the general preparatory work going into the stalls and perhaps not over 6 or 8 for the special digestion stalls for certain definite periods during the year.

ANIMAL HUSBANDRY INVESTIGATIONS.

STATEMENT OF MR. E. W. SHEETS, BUREAU OF ANIMAL INDUSTRY.

Mr. SHEETS. The animal husbandry investigations pertain to all other classes of animal, except dairy animals—beef cattle, hogs, sheep, horses, and poultry. There are three items—three projects—which are being emphasized here, for which slight increases have been asked in the total 12 projects. The first one is that of genetic research. Genetic research, up until about two years ago, consisted of work with guinea pigs almost exclusively, for the purpose of working out certain fundamental principles in genetics. We believe that these problems have given us certain facts pertaining to inbreeding and cross breeding that we wish to confirm with respect to the larger animals. We have two projects—one with swine and one with poultry—which will require the services of a specialist to keep the technical and voluminous data on weights, gains, and other information until the experimental animals are mature. This will enable us to determine certain facts which have practical value to stockmen. This item provides only the \$3,000 for the salary of a specialist. There is now being spent on genetic research \$10,065.

The other item pertains to nutrition research, which is divided into two phases of work. One is for the investigations with reference to meat animals, including poultry. One line of investigation connects up with the various phases and studies on soft pork. The other is for projects other than soft pork, which include poultry, animal fibers, and certain other nutrition studies to determine the values of feed in connection with other animal husbandry projects. It is not for starting new projects but for continuing projects now under way just a little further with these same animals which will require very little more feed. In other words, we wish to utilize the animals which we now have in other experiments, and the same facilities, merely carrying them a step further to get out of them all there is in the way of information. This would require \$3,880 for the meat investigations, including poultry and eggs. That would be used. \$3,000 for a specialist and \$880 for items of equipment and laboratory supplies, and \$2,500 would be used for an assistant in the chemical laboratory to assist with the chemical analyses in the soft-pork work.

Mr. ANDERSON. How far have you got with the soft-pork work? Have you got anywhere yet?

Mr. SHEETS. We have been making very substantial progress. The work has been carried on in connection with 10 experiment stations, also in connection with the Institute of American Meat Packers. With reference to results obtained we have made very substantial progress this year. I do not state that we have solved any one phase of the soft pork problem but I believe what work we have done will have gone a long way in throwing light on the matter when the data is finally worked up. In other words, feed represents one of the causes of soft pork; and hogs which once become soft harden with great difficulty. At the live stock experiment farm, at New Iberia, La., it was found that the feeding of rice products and molasses, and at the Coastal Plains Station, at McNeill, Miss., the feeding of sweet potato by-products had hardening effects on soft hogs, and that feeds like peanuts and soy beans produce pork soft in character.

The other item of \$6,300 is for making slight improvements in the abattoir and laboratory. That is the abattoir and laboratory where this work is done.

Mr. ANDERSON. Where is it done?

Mr. SHEETS. At Beltsville, Md. That is, the slaughtering work is done there. The hogs are shipped periodically to this station, three or more at a time out of each test lot, for slaughter and general analyses. The laboratory was not built originally for this work, merely being converted for this purpose. It is too small for handling the work satisfactorily. For instance, if we have a large hog we can not hang it up in the abattoir to cool without first cutting off its head. Whenever one is required to handle two pieces, for instance, the hog and its head, weighing them, to determine the shrinkage after cooling, it increases the work and at the same time increases the possibility of error. What we want to do is to elevate the ceilings of the cooling rooms about a foot or 18 inches so that they will accommodate the largest hog that is likely to be killed in connection with this work.

There have been no modifications of the abattoir or repair work done on this laboratory within the last six years.

Mr. ANDERSON. Where do these hogs come from?

Mr. SHEETS. They come from the cooperating experiment stations. The states that are cooperating in this work at this time are Alabama, Georgia, Kentucky, Indiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Texas.

Mr. ANDERSON. Go ahead.

Mr. SHEETS. That covers the three principal items for which we are asking increases.

Mr. BUCHANAN. The three increases?

Mr. SHEETS. Yes, sir.

CLARK COUNTY EXPERIMENTAL STATION, IDAHO.

Mr. ANDERSON. Where is this sheep ranch you have? It is somewhere in Idaho?

Mr. SHEETS. At Dubois, Idaho—a special sheep ranch. The United States Sheep Experiment Station at Dubois has an area of

28,000 acres of typical western grazing land that was withdrawn from settlement by order of the President in 1915. This area is sufficient to maintain the 4,000 breeding ewes which were contemplated when the project was started, but has not been realized as yet. We have at the present time about 1,500 breeding ewes, 50 mature rams, about 100 ram lambs, and 550 ewe lambs, or a total of about 2,200 head of breeding sheep on that ranch. We had expected to add about 2,500 ewes, to bring this up to a total of 4,000 ewes of breeding age needed for the proper study of range-sheep problems. When we bring this up the returns will more than pay for the upkeep and maintenance of the station. In fact, with the 1,500 ewes of breeding age, 550 ewe lambs, and 150 rams during the last year there was a gross return from this station amounting to about \$25,000, including cash turned into the Treasury and the inventory value of young stock added and of wool on hand at the close of the year.

Mr. ANDERSON. What was the cost of operation?

Mr. SHEETS. The cost of operation is about \$28,000.

Mr. BUCHANAN. That does not mean any improvements at all?

Mr. SHEETS. That does not mean any improvements.

Mr. ANDERSON. Were there any improvements made on the place last year?

Mr. SHEETS. Yes, sir. We are completing the reservoir for the water supply station which has been one of the things that has been needed ever since the station was established in 1915. We built 12 miles of fence and added more room to the laborer's cottage.

Mr. ANDERSON. If I remember aright this \$8,000 immediately available covers the buildings out there on that sheep ranch. What are you going to do with this next year? The chairman of the Agricultural Committee is very jealous about any construction, so I want to know what the reason for spending this \$8,000 is.

Mr. SHEETS. There is one item that has been needed and is now very greatly needed which we have an opportunity to put in in cooperation with some other ranchmen at a considerable saving of money, and that is the electric power for lights and for other power at that station. The neighboring ranchmen—the Wood Livestock Co., I believe it is—are putting in their poles for this line and with our participation we will be able to get our power for something like \$1,000 to \$1,800, while if we put it in alone it would cost several times that.

Mr. ANDERSON. Where do you get the power from?

Mr. SHEETS. From the main line between Dubois and Spencer.

Mr. ANDERSON. Do you use it for electric lights only?

Mr. SHEETS. For electric lights, for pumping, for the preparation of feeds, for the filling of silos, and for general farm-power purposes.

Mr. ANDERSON. Are you producing anything on the ranch now except grass?

Mr. SHEETS. We have been producing some corn and some sunflowers. That has been the chief task there, to get enough feed other than roughage like hay. In fact, it is the problem of the ranchmen everywhere, but we have been very successful with sunflowers and fairly successful with corn, and I believe as time goes on we will have gotten the land in shape in the way of stones and other obstacles, so that it will produce a little more.

Mr. BUCHANAN. Is this rocky land?

Mr. SHEETS. There are plenty of them there. It is volcanic land and lava rock is scattered over a large part of the 28,000 acres. Of course you can not cultivate there like you can in the great Corn Belt.

Mr. ANDERSON. What would it cost to put this line in?

Mr. SHEETS. The closest estimate is right around \$1,000.

Mr. ANDERSON. All right, that will give you \$7,000. What are you going to do with that?

Mr. SHEETS. There is about 20 miles of fence that ought to be put up to enable us to handle these sheep in flocks of the proper size, for the correct conduct of the breeding and grazing investigations.

One of the greatest needs at that station right now outside these other items is for a place for the man in charge to live.

Mr. ANDERSON. I have been hearing that, I think, for four or five years and this item has carried that \$8,000 for I do not know how long. If that is so important why do you not build it?

Mr. SHEETS. We have never had the authority to put up this residence for the superintendent. We have put up one for the foremen and we put up one for the laborers—that is the laborers' bunk house you might call it—but have never had the authority to construct the house for the farm superintendent.

Mr. BUCHANAN. Where does he stay?

Mr. SHEETS. He stays in a two-room shack, with a little porch and an office back of that.

Mr. BUCHANAN. Is he married?

Mr. SHEETS. Yes, sir. We just lost the superintendent of this station, and it is partly due to the dissatisfaction of his family with the conditions. It has been a great loss to the station and the sheep industry that he left the section.

Mr. ANDERSON. What will this house cost you?

Mr. SHEETS. By using our own facilities, as we can do (we have all the construction facilities and farm labor), we can put up a good house there to keep a good man there, and there is not anything else to keep him, for around \$4,000.

Mr. ANDERSON. How many men do you keep employed out there?

Mr. SHEETS. During the summer season, including all men and the man in charge, we have about nine. During the lambing time we increase that by two or three herders, as necessity demands.

Mr. JUMP. Dr. William A. Taylor is here, if the committee desires to finish these miscellaneous items.

Mr. ANDERSON. Does this finish animal husbandry?

Mr. JUMP. I think so.

Mr. ANDERSON. Does your general statement, Doctor Mohler, cover the work done under this animal industry item?

Doctor MOHLER. Yes, sir.

FRIDAY, NOVEMBER 17, 1922.

BUREAU OF PLANT INDUSTRY.

**STATEMENTS OF DR. WM. A. TAYLOR, CHIEF OF BUREAU,
AND DR. KARL F. KELLERMAN, ASSOCIATE CHIEF, BUREAU
OF PLANT INDUSTRY.**

Mr. ANDERSON. We will take at this time salaries, Bureau of Plant Industry, on page 72 of the estimates, beginning with the statutory roll.

Doctor TAYLOR. I have a brief summary statement, summarizing the general character of the work of the bureau, which it will not be necessary to read, probably, but which might in the record of the hearing be helpful, in that it covers any particular points which are not covered in the explanatory notes relating to the changes in the appropriation.

Mr. ANDERSON. Without objection, it will go into the record without reading.

(The statement referred to and submitted by Doctor Taylor is here printed in full, as follows:)

GENERAL STATEMENT OF WORK.

The work of the Bureau of Plant Industry is almost entirely of an investigational character, devoted to acquiring knowledge concerning fundamental principles governing crop production and crop utilization. The bureau activities include the improvement of crop plants by selection and breeding; the introduction of important varieties of fruits, grains, forage crops, and other plants from foreign countries; the investigation of destructive plant diseases and the development of methods for their control; and the carrying on, in cooperation with States directly concerned, of special campaigns for the control or eradication of epidemics of unusually serious plant diseases, such as black stem rust of wheat, citrus canker, white-pine blister rust, etc.

The bureau carries on experimental work in all sections of the United States, frequently upon land furnished by State experiment stations or controlled under lease, in addition to the permanent field stations, the most extensive of which is the experiment farm on the Arlington estate in Virginia. In cooperation with the Reclamation Service of the Department of the Interior, agricultural experimentation is conducted on the irrigated lands of the Government reclamation projects. A seed and plant exchange service is conducted between experts of foreign countries and American experts. The bureau supervises the purchase and distribution of vegetable, flower, cotton, tobacco, lawn-grass, and drought-resistant seeds, and of bulbs.

The complete activities of the bureau are too complex for detailed statement. A brief selection is here presented to show the general scope of the bureau's work; this statement is supplemental to the explanations for increases or other changes that are presented in the estimates.

CONTROL OF THE WHITE PINE BLISTER RUST.

White pine blister rust is a destructive plant disease that reached America about 1900. It was introduced from Europe on infected white pine nursery stock, which was planted in many places in the eastern United States. In 1913 it was found attacking native white pines, but its wide distribution was not suspected until the late fall of 1915, when the rust was discovered on currant and gooseberry bushes and white pines over a large area in Massachusetts and New Hampshire. Since then practical measures have been developed for the control of this disease under eastern conditions, which consist of the eradication of currant and gooseberry bushes within 900 feet of the pines. The outstanding feature of the white pine blister rust situation during the past year was the discovery of this destructive disease in the Puget Sound region of British Columbia and Washington. The department, in cooperation with State and Canadian authorities, has taken prompt action to determine the extent of the infected area and if pos-

sible to control or eradicate this new outbreak of the disease. The age of infection found on pine trees proves the disease was present in British Columbia in 1916, prior to the enactment of the Canadian blister rust quarantine.

MOSAIC AND LEAF ROLL OF POTATO.

Investigations of the so-called degeneration diseases, mosaic, leaf roll, and related troubles of potatoes, which have been in progress for several years, show that this group of maladies has become the greatest handicap to potato improvement and causes serious loss annually to producers throughout the country. The outstanding feature of the results secured is the discovery that aphids are the most effective natural means in the transmission of these diseases. In addition, it has been found by an investigator of the Maine Experiment Station that the principal overwintering host of the potato aphid is the rose. Last season's observations indicated that both streak and curly dwarf are closely related to mosaic and similar diseases of the potato. Plants becoming infected during the latter part of the growing season, when further growth has practically ceased, will not exhibit any of the symptoms of mosaic, but the tubers from such hills will produce infected plants the following season, the disease being more severe if the affected stock is planted in the South. Last season's experiments on control of mosaic by roguing confirms previous results, showing that roguing under ordinary field conditions, with mosaic plants in adjoining plots, will not free such stock from the disease, but will tend to reduce the percentage of diseased plants, provided it is done thoroughly and continued throughout the season.

DEVELOPMENT UNDER ARTIFICIAL LIGHT.

Continuing the investigations on the effects of the relative length of day and night on plant growth, fairly extensive experiments have been undertaken on the response of woody perennials to this factor, especially with reference to such problems as the basis of winter hardiness, the natural distribution of plants, and their flowering and fruiting habits. Application of this process to a number of species shows that initiation of flowering and fruiting and other characteristic responses to differences in duration of the daily illumination period are brought about as readily with artificial illumination as with sunlight.

THE PROBLEM OF UTILIZING SUPERIOR VARIETIES OF COTTON.

On account of the present organization or lack of organization in the cotton industry, most of the seed is inferior, and there is no assurance of any general utilization of good varieties. Methods of breeding and acclimatization have been developed and demonstrated, but other requirements must be met if a full utilization of superior varieties is to be secured. The discovery and development of a series of superior varieties, including the Lone Star, Trice, Columbia, Meade, Durango, and Acala, make it possible to place the different regions of the cotton belt on new planes of improved production, and all these varieties are being grown as extensively as the available supplies of good seed will permit, but the inadequacy of the present systems of providing annual supplies of planting seed is also being recognized and methods of improvement devised. Efforts are being made, therefore, to avoid the general mixing of seed at the public gins, and crossing of the different varieties in the fields, which undoubtedly are responsible for the rapid and general deterioration of seed stocks that tend to keep our producing industry on a low plane of efficiency.

RUBBER.

The need of developing home supplies of rubber is becoming recognized, in view of the danger of complete dependence on the remote East Indies for this essential raw material. It is known that several species of rubber-producing plants can be grown in the United States, if practical methods of utilization can be devised. The Central American rubber tree (Castilla) is considered inferior to the Para rubber tree (Hevea) for the purpose of commercial cultivation by methods employed in the East Indies, but Castilla may have a special value in developing rubber reserved in tropical America. Such reserves of rubber should be available in regions contiguous to the United States in case of emergencies that might interfere with communication or with the production of rubber in the East Indies. For emergency use, Castilla would have an advantage in yielding its latex more readily.

BINDER TWINE FIBERS.

The cooperative work with the Philippine Bureau of Agriculture to encourage the production of machine-cleaned sisal and cantala fiber in the Philippine Islands is resulting in a steadily increasing production of these fibers. The machine-cleaning demonstrations, conducted during 1918 and 1919 with Government-owned machines, were followed by the establishment of machine cleaning on a commercial basis. During the calendar year 1920, the Philippines produced 707 bales of machine-cleaned fiber; during 1921, the production amounted to 5,138 bales; and, during 1922, the production has been in excess of 1,000 bales per month. With the maintenance of the present rate of production the Philippines will produce, during the calendar year 1922, approximately 4,000,000 pounds of machine-cleaned binder twine fiber, or a supply sufficient to provide binder twine for 2,000,000 acres of grain crops.

SEED TESTING.

During the fiscal year 1922 the seed-testing laboratories of the Bureau of Plant Industry received and examined 29,671 samples of seeds. Of these 17,100 came to the Washington, D. C., laboratory and 12,571 to the five branch seed-testing laboratories maintained in cooperation with the State institutions. These samples represent both vegetable and field seeds from farmers, seed dealers, and investigators, to whom reports of analyses were sent showing the presence of weed seeds and worthless material, or germination, or both, as requested.

CEREAL IMPROVEMENT.

Increased yields of wheat, oats, and other cereals, as well as an extension of their range, have been secured by the introduction of new types from foreign countries and by selection and breeding work, both by the State stations and by the department. During recent years the most notable wheats are probably Kota, a bearded, hard red spring variety, resistant to stem rust; Kharmont, a high-yielding selection of Kharkof hard red winter wheat, especially desirable under Montana conditions; Hard Federation and Federation, two varieties of white wheat suitable for the Pacific coast area, and the rust-resistant Durum wheats, which outyield other varieties in the spring wheat belt and are satisfactory for the manufacture of semolina, although not for the production of first-quality macaroni.

BARBERRY ERADICATION FOR THE CONTROL OF BLACK STEM RUST.

The campaign for the eradication of the common barberry in order to control the black stem rust of wheat was begun in the spring of 1918 and is now in its fifth year. The eradication area comprises 13 of the north-central wheat-growing States, namely, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. All of these States now have enacted legislation requiring the removal of common barberry bushes. The campaign is conducted in cooperation with the State agricultural college in each of the States, with the State department of agriculture in most of them, and with the conference for the prevention of grain rust. Investigations of the time, rate, and manner of spread of rust from barberries, made during the summer, give additional evidence of the enormous losses directly traceable to individual bushes and hedges.

CORN DISEASES.

Investigations conducted in several States on corn root, stalk, and ear rots show this group of diseases to be responsible for reductions in yield of marketable corn, ranging above 30 per cent. Control measures are being developed from both the standpoint of seed selection and field management. The most feasible control measures thus far developed are careful field selection of seed corn ears before frost, proper curing and storing of these ears, and a further weeding out from this selected stock of those ears showing disease in germination tests.

CHLOROSIS DUE TO MAGNESIUM DEFICIENCY.

In further work on the significance of magnesium as a constituent of fertilizers for tobacco and other crops it has been found that corn, like tobacco, develops characteristic pathological symptoms on certain soils when magnesium is omitted from the

fertilizer. It has been discovered also that proper balance between the supply of magnesium and sulphur in the fertilizer or soil is a factor of importance in plant growth and that this balance is likely to be greatly affected by the amount of the seasonal rainfall. In relatively dry seasons symptoms of sulphur deficiency are more evident, while in wet seasons magnesium deficiency becomes more acute, probably because of the sulphur brought into the soil by rain, in conjunction with loss of magnesium by leaching. As a result of field plot tests carried out in most of the important tobacco-growing sections, in which chemically pure salts were used instead of the usual commercial fertilizer materials, it has become evident that under certain conditions magnesium deficiency may result in serious damage to tobacco, even on newly cleared land, and the crop is subject to injury from this cause in various localities. It has been demonstrated that the necessary quantity of magnesium for correcting this deficiency may be readily supplied by using in the fertilizer potash salts containing appreciable quantities of magnesium or by the application of magnesium limestone to the soil. It is obvious, therefore, that the element magnesium must be taken into account both in the general problem of liming and in the proper choice of commercial fertilizer materials, particularly in the use of highly concentrated fertilizer formulas.

SUGAR-CANE MOSAIC.

Mosaic disease of cane has been found in each of our cane States and every field has been inspected and the degree of infection, if any, has been determined and recorded. Some of the States are cooperating with us in the control of the mosaic disease in the cane areas. The disease has been reduced practically to the point of elimination in parts of Porto Rico and in the eastern and peninsula part of Florida, where roguing advocated by the Bureau of Plant Industry has been practiced according to directions.

THE QUALITY OF IRRIGATION WATER IN RELATION TO IMPERMEABLE SOILS.

Investigations have been continued on the significance of the salts dissolved in irrigation water in rendering heavily irrigated soils impervious. The application of calcium sulphate or gypsum in small quantities serves to prevent the injurious effects on the soil of the irrigation water that is deficient in calcium and magnesium salts. The same treatment is often beneficial slowly and to a limited extent in correcting conditions of impermeability that already exist. When the condition of impermeability is serious the action of the gypsum is often very slow because of the fact that it is not very soluble. For such conditions it has been found that aluminum sulphate is more effective than calcium sulphate in flocculating the soil colloids and making the soil more permeable to irrigation water.

CONDITIONING OF CITRUS FRUITS.

It is becoming an accepted fact that some citrus fruits reach their highest edible quality before their color changes from a chlorophyll green to the orange or yellow shades of color which the consumer and the public generally have come to associate with a citrus fruit in good edible condition. If such fruit is allowed to remain on the tree until it develops the desired color, it may lose in edible quality and, besides, it may be possible to market it to much better advantage at an earlier period. This is true particularly of Satsuma oranges and one or more early-ripening varieties of orange grown in Florida. Considerable attention has therefore been given to the working out of practical methods of hastening the development of a ripe color of such citrus fruits. While this work has been in progress for several years, its commercial application has been given particular attention during the past year. The method of procedure is to confine the fruit in a compartment which can be made practically air-tight and to subject it to the products of incomplete combustion of kerosene or gasoline.

NURERY STOCK INVESTIGATIONS.

In view of the fact that this country has been so dependent upon foreign sources for many of its fruit stocks, the attempt has been made to find out whether American sources of seed and American-grown stocks may not be produced which will have all of the merits of the imported stocks. For apples, at least, it appears that satisfactory seed supplies can be found, and by a new method of propagation from rooted cuttings it appears that very satisfactory type of stock production for nursery purposes can be very rapidly developed for certain purposes, being probably about as economical as the production of the seedlings. Similar methods appear to be applicable also for rose and pear stocks.

NEW VEGETABLES.

Work on the introduction and establishment of the dasheen, chayote, and tropical yams has been carried forward and many experimenters have been supplied with material for propagation. The market for dasheens is growing, not only among our foreign-born population who have been familiar with these vegetables in their early homes, but also among native Americans. Commercial shipments totaled about ten carloads last season. About 350 persons are this year growing yams experimentally and for market, from propagating material supplied by the bureau. The chayote, a subtropical vegetable of the squash family, is now produced in commercial quantities in some of the Southern States, and the department is cooperating with dealers in northern cities who desire to bring this new vegetable to the attention of the American public.

FORAGE INVESTIGATIONS.

Pasture and meadow investigations are of unusual importance in that they represent under present conditions the cheapest form of animal feed. Improvements in pastures and meadows have come largely from the introduction of improved species from abroad. For example, molasses grass, introduced by the Bureau of Plant Industry in the southeastern United States from South America, is beginning to be utilized by stockmen. The Mung bean, velvet bean, and soy bean are well established and adding materially to the quantity of forage produced in the areas where grown. Investigations by the bureau of the relative value of imported red clover seed in comparison with domestic clover seed show that, in general, the imported red clover seed is more liable to winterkillings, and also more likely to die after the first cutting following the winter season, than plants grown from domestic seed.

DEMONSTRATIONS ON RECLAMATION PROJECTS.

Demonstration work has been conducted the past year on 11 Federal reclamation projects as follows: Minidoka, Idaho; Umatilla, Oreg.; Uncompahgre, Colo.; Huntley, Milk River and Sun River, Mont.; Shoshone, Wyo.; North Platte, Nebr.-Wyo.; Belle Fourche, S. Dak.; Newlands, Nev.; and Yuma, Ariz.

SALARIES.

REDUCTION IN NUMBER OF EMPLOYEES.

Doctor TAYLOR. On page 72 of the statutory roll there are changes which in total involve the dropping of 17 statutory places, covering \$15,900, the transfer out of the Bureau of Plant Industry to the Secretary's roll of two places at \$720 each and the transfer into the Bureau of Plant Industry from the Bureau of Agricultural Economics of four places at \$1,200 each. This transfer in is necessary to complete the transfer to the Bureau of Plant Industry from the Bureau of Agricultural Economics of the fruit and vegetable transportation and storage investigational work. The lump appropriation for that was transferred last year, but, through oversight, the transfer of four statutory clerical places that belonged with that work was not made. This covers that. So that the net change in the statutory roll of the Bureau of Plant Industry involves an apparent decrease of \$12,540 but an actual decrease of \$15,900.

Mr. BUCHANAN. These dropped places—17 of them at \$900, are there not?

Doctor TAYLOR. There are seven at \$960 and six at \$840—

Mr. BUCHANAN (interposing). You need not state them, unless you want to give them.

Doctor TAYLOR. One at \$1,080, three at \$1,020 each.

Mr. BUCHANAN. These are not filled now, are they?

Doctor TAYLOR. They are places which have been intermittently filled and vacated, places where we have had temporary people for

parts of the year at various times, and we figured that we could protect that intermittent need in other ways.

Mr. BUCHANAN. In other words, the salaries have been low and it has been hard to keep anybody in there, and those places have been vacant most of the time.

Doctor TAYLOR. A fair proportion of the time; some of them most of the time.

Mr. BUCHANAN. And you concluded there was no use in keeping the places open?

Doctor TAYLOR. Yes, sir.

Mr. BUCHANAN. They would have been dropped whether you had any of this reorganization or not?

Doctor TAYLOR. They are convenient in that they do not involve encroachment on our lump fund at the times when we need people, but we can, we figure, get along without them.

Mr. ANDERSON. There is one item I want to ask you about at the bottom of this page 72. You have 88 laborers at \$720 each reduced to 86. Those are two that were transferred to the Secretary's roll?

FOR INVESTIGATION OF PLANT DISEASES AND PATHOLOGICAL COLLECTIONS.

Doctor TAYLOR. Yes, sir. The next is general expenses, Bureau of Plant Industry, page 74—the subappropriation for investigations of plant diseases and pathological collections, including the maintenance of a plant disease survey: There are changes involving an apparent decrease of \$5,000. Actually there is no change in the amount of money that will be available for the work heretofore carried on. Fifteen thousand dollars is shifted from this subappropriation to the next subappropriation, that for the investigation of diseases of orchards and other fruits, including the diseases of the pecan, as follows: \$10,000 heretofore carried by the proviso in this subappropriation for research in brown rot and kindred diseases of peach trees, and \$5,000 not specifically provided but added to this paragraph at the last session for fruit diseases work. The fruit disease of the department is carried in the paragraph succeeding this, and it is desirable to have the funds there rather than in this place. It involves merely the shift of the funds to the unit where the work is done. Partially balancing this transfer out of \$15,000, there is a transfer into this of \$10,000 from the subappropriation for cereal disease control, which it is proposed to drop. That you will find on page 102.

Mr. BUCHANAN. Let me get this clear in my head. You speak of a transfer. You do not mean you transfer an appropriation already made?

Doctor TAYLOR. No.

Mr. BUCHANAN. In other words, you do not need so much you have under one item and you knock that off of that item and so you have that much more on another item?

Doctor TAYLOR. It is not quite that, Mr. Buchanan, in that these funds will be used, if Congress approves of this shift, next year for exactly the purpose for which they were provided and for which they are being used this year. The history of these particular items is this—on the floor of the Senate two years ago the proviso of \$10,000

was added for peach disease work centering in Georgia, and it was added to the wrong subappropriation through accident presumably.

Similarly the \$5,000 which is not covered by a specific proviso was added last year in the Senate. As it stands it is out of line with the orderly character of the appropriation, and while we can use it where it is it would be better to make these changes in the location of the funds.

Mr. BUCHANAN. You mean you could use it where it is for the purpose for which it was intended?

Doctor TAYLOR. For which it was provided, yes.

Mr. BUCHANAN. But now you are attempting to get these appropriations that were put under the wrong subhead in the right subhead?

Doctor TAYLOR. Yes, sir.

Mr. BUCHANAN. All right.

Doctor TAYLOR. So that the apparent net decrease of \$5,000 in this paragraph, which results from these two shifts, does not change the amount of money available for the work now being carried on. It merely shifts it to another place.

FRUIT DISEASE INVESTIGATIONS.

On page 76 the paragraph for investigation of orchard and other fruits, including the diseases of the pecan: As a result of the shift I have just mentioned there is an apparent increase of \$19,000. And this \$15,000 is that which I have discussed; \$4,000 is desired of actual increase for enlargement of the research work on citrus fruit diseases in the Gulf States, where the work has been proceeding very efficiently and has yielded excellent results. There is need, in particular, for a more thorough study of those diseases which affect citrus fruits after harvest, while in transit, and on the market, in connection with the Florida citrus industry in particular.

Mr. BUCHANAN. Normally they are free from diseases?

Doctor TAYLOR. They are this year probably in greater trouble than they have been for several years with what is known as stem-end rot, which is a disease that is not conspicuous while the fruit is on the tree, but which does produce quick decay after the fruit is harvested if it is not very quickly cooled to a low temperature; and they have been having some heavy losses in transit during the last six weeks. The matter has been very thoroughly considered. We have an excellent organization, with a temporary pathological field laboratory at Orlando, Fla., where we have the equipment and the personnel, except that we need an additional assistant to make this work adequately effective.

Mr. BUCHANAN. Before you leave that: How long have you had this appropriation to investigate orchards and other fruit; this is diseases of pecans, though, is it not?

Doctor TAYLOR. This is diseases of fruits.

Mr. BUCHANAN. And diseases of the pecan?

Doctor TAYLOR. Yes, sir.

PECAN DISEASES.

Mr. BUCHANAN. Have you any bulletin on the pecan?

Doctor TAYLOR. Yes, sir; in particular bulletins on two or three of the pecan diseases. The disease causing most apprehension at present

in the organized pecan production regions is pecan scab, a fungus disease which attacks the leaves and the hulls of the nuts. It often causes a defoliation of the tree.

Mr. BUCHANAN. You mean the outer hulls?

Doctor TAYLOR. Yes.

Mr. BUCHANAN. The pecan has two hulls, one of them opening.

Doctor TAYLOR. The shuck, they call it. And where the attack is severe the fungus causes the browning and dieting of the outer skin of the shuck, and a premature ripening of it.

Mr. BUCHANAN. And premature adhering of the shuck to the pecan itself?

Doctor TAYLOR. Yes. And without filling; the meat does not fill; and, worse than that, the fruit buds for the next year, if the tree is badly defoliated, do not set, so that the effect on the next year's crop is bad.

Mr. BUCHANAN. Do you know the reason why the pecan is so stubborn about bearing only every other year?

Doctor TAYLOR. No one knows with exactness, but that seems to be a characteristic which practically all of our fruit and nut bearing trees in the forests have. We rarely get two heavy crops in succession under wild conditions. One of the main purposes of orcharding and of cultivation and of spraying with the pecan, as with other tree fruits and nuts, is to steady the production by maintaining a balance between vegetative growth and fruiting, so that a heavy crop does not exhaust the tree beyond the possibility of a reasonable crop the next year. In orchard trees like the peach a good deal is accomplished by the thinning of a too-heavy crop, reducing the load and the draft on the vitality of the tree. With the pecan that is not practicable, and we have to accomplish it through more effective tillage, fertilizing, and spraying where a disease like scab is involved, to steady the tree through its full-crop year.

Mr. BUCHANAN. It might need irrigation?

Doctor TAYLOR. It might need irrigation at critical times in some places; that is a possibility.

Mr. BUCHANAN. I wish you would send me bulletins, if you have them, on that, and a few copies of these bulletins on pecans, or anything else relating to them.

Doctor TAYLOR. I will send you what we have.

Mr. BUCHANAN. A good many of my constituents are deeply interested in that, and ours is a splendid region for them, and we are trying to grow them.

Doctor TAYLOR. So that the net increase proposed here is \$4,000 for the enlargement of that citrus-disease work.

CITRUS CANCER ERADICATION.

The next appropriation is page 78, for citrus canker eradication. I will ask Doctor Kellerman to discuss that. There is an apparent increase in it of \$30,000 over the regular appropriation of last year.

Mr. ANDERSON. You had a deficiency appropriation of \$100,000 last year?

Doctor TAYLOR. You recall that at the very end of the session when the exigency developed, there was a deficiency appropriation of

\$100,000, which made the total amount available during this fiscal year \$130,000. So that this estimate, which is an apparent increase of \$30,000, actually involves a decrease of \$70,000 below the total available for this purpose this year.

Mr. ANDERSON. We will now hear Doctor Kellerman.

Doctor KELLERMAN. The only point to bring out in connection with this item, I believe, is that the decreases that we had recommended in early years were probably made a little too rapidly, and if we had not cut the work to \$30,000 during last year, if we had kept about \$50,000 or \$60,000 in that work, I believe it is certain that no emergency appropriation would have been necessary.

OUTBREAK OF CITRUS CANCER EPIDEMIC SERIOUS.

The epidemic of citrus canker which developed in southern Florida at a town called Davie, Fla., was a direct result of inability to inspect that region for a considerable period of months. That outbreak is the only serious outbreak that we have had in the canker work during the fiscal year, although two other small outbreaks, also the result of not being able to carry on adequate inspection work throughout the territory, have occurred—one in Alabama and one in Mississippi. There is still known to be a scattering infection of canker in Louisiana, and there are some areas in Texas that are under suspicion. In general, however, the work is now in good enough condition so that we believe that we can handle it adequately with \$60,000 and also have a very small reserve that can be drawn on in case of small outbreaks.

Mr. ANDERSON. Is there any possibility or probability that the disease can be entirely stamped out in time?

Doctor KELLERMAN. In time I think that can be done. It can not be done in the coming fiscal year. The difficulty in eradicating the disease from areas where citrus is not commercial, like some parishes in Louisiana and the northern Gulf region of Texas, are the really serious difficulties in the work. I believe that within the next two or three years we can complete the eradication work of all of the areas where citrus is at all commercial; that is, in southern Texas and the southern part of Louisiana, below New Orleans.

Mr. ANDERSON. I suppose even if you felt it was completely eradicated that there would be necessity of continuing the inspection for some time.

Doctor KELLERMAN. For a few years it would be a very wise investment; it would be in the nature of insurance, and I believe a very cheap insurance.

CITRUS INDUSTRY PROFITABLE TO COUNTRY.

This citrus industry has undoubtedly in income taxes, in land taxes, and in other ways already more than returned to the country the amount of money that has been expended on it, as well as having the industry saved to the people who are growing orchards in the South.

Mr. ANDERSON. Do you find the owners willing to cooperate and prompt in reporting what they suppose to be the canker?

Doctor KELLERMAN. We have, I think, universal cooperation at the present time. It has been very enthusiastic in the areas in which there is a commercial citrus industry, such as southern Texas and in the Mississippi, Alabama, and Florida regions, where round orange or Satsuma oranges or grapefruit are grown.

Doctor TAYLOR. I think it would be a fair statement, Mr. Chairman, to say that there has been a very marked change of attitude on the part of citrus growers as this work has progressed. In the beginning they were fearful of adverse effect upon land values and that sort of thing as it became known that their groves were under suspicion. They have since recognized that secrecy would ultimately result in harm, and they are now very frank and prompt to bring any suspicious case to the attention of the specialists. So a very wholesome readjustment of opinion has developed.

Mr. ANDERSON. Is the disease difficult to diagnose?

Doctor TAYLOR. To distinguish from the widely prevailing citrus scab, which is not nearly so serious.

DISEASES OF FOREST AND ORNAMENTAL TREES AND SHRUBS.

On page 80, the subappropriation for the investigation of diseases of forest and ornamental trees and shrubs, there is no change. We propose a continuation of that work as it is.

WHITE PINE BLISTER RUST CONTROL.

The same remark applies to the subappropriation for white pine blister rust control, on page 82. The only change suggested there being the omission of the provision of \$50,000 to be immediately available, which was necessary last year to inaugurate the enlarged educational campaign in the Eastern States, upon a basis of full-season activity.

Mr. ANDERSON. I think you had better tell us something of what you are doing on this item, in view of the increase in the amount over last year.

PROGRESS OF WORK.

Doctor TAYLOR. This is briefly referred to in the statement that I have already submitted, but it would perhaps be well for me to read the paragraph for the committee, it appearing in that preliminary statement. [Reading:]

White-pine blister rust is a destructive plant disease that reached America about 1900. It was introduced from Europe on infected white-pine nursery stock, which was planted in many places in the eastern United States. In 1913 it was found attacking native white pines, but its wide distribution was not suspected until the late fall of 1915, when the rust was discovered on currant and gooseberry bushes and white pines over a large area in Massachusetts and New Hampshire. Since then, in cooperation with the affected States, practical measures have been developed for the control of this disease under eastern conditions, which consist of the eradication of currant and gooseberry bushes within 900 feet of the pines. The outstanding feature of the white-pine blister-rust situation during the past year was the discovery of this destructive disease in British Columbia and the Puget Sound region of southwestern Washington. The department, in cooperation with State and Canadian authorities, has taken prompt action to determine the extent of the infected area and if possible to control or eradicate this new outbreak of the disease. The latest information indicates that the disease was introduced into British Columbia about 1910, prior to the enactment of the Canadian blister-rust quarantine.

PLAN OF WORK FOR COMING YEAR.

Now, supplementing this statement and specifically with reference to the enlarged program now in effect, the plan of work is this: This applies to the Great Lakes, New York, and New England white pine territory. Wherever in territory white pine is being encouraged to replace itself, to reseed itself and be treated as a timber crop for future harvesting, and the local interests are willing to put their money into the eradication of the currant and gooseberry bushes which make possible the spread of the disease from pine to pine, the department places a blister rust educational agent. He is in a county, the man who does as regards blister rust control, through ribes eradication, ribes being currants and gooseberries, what the county agent does for agriculture. He works with and in many cases is quartered with the county agent. He devotes himself to the locating of the areas within which it is advisable to undertake this work systematically, gets in touch with the owners of the land, acts as a general adviser and supervisor of the actual eradication work, which is paid for by the State, the town, and by individual contributions, that phase of the work being not financed from the Federal appropriation at all.

So that the blister rust control campaign now is under way in approximately 50 counties where white pine has acquired the status of a crop, to be cared for and ultimately harvested for profit. It involves the correlation of the interest and activity within those States of the State forestry activities, the State agricultural extension activities, and the department's activities, the department paying the salary of this special man to lead in that work.

STATES AND INDIVIDUALS COOPERATING WITH DEPARTMENT.

Mr. BUCHANAN. Is that all the Federal Government pays?

Doctor TAYLOR. Yes. You will recall that previously this work in its pioneer stages was handled upon a basis of joint financing of the eradication work. That plan worked fairly well through the pioneer stages, but it appeared to us that it had reached a place where there was sufficient knowledge of the methods that needed to be adopted, and that the main job from now on is an intelligent, efficient, properly supervised leadership of an educational campaign, the bill for which, as regards the actual clearing out of these disease-transmitting plants, should be borne by the people and the States that would have the crop saved.

Mr. BUCHANAN. Are all those county or State local agencies responding to the terms of that agreement as carefully and fully as is necessary and required?

Doctor TAYLOR. Very satisfactorily. I would like to say that we have not reached the peak of efficiency yet, because such a campaign takes time, particularly, Mr. Buchanan—I wish Mr. Wason were here—in a region that is as ruggedly conservative as the white pine back country of New England, where the people are of the old-time stock. The leaders, however, are awake, and they have come into line very satisfactorily. The leaders are awake, including the selectmen of the towns, who constitute the administrative leadership in the localities. We believe the plan is sound, that it is operating satis-

factorily for a first-year operation, and I am deliberately conservative in my expression on that.

Mr. ANDERSON. Where has there been sufficient eradication in any locality to demonstrate that the eradication when it is completed really does do the business?

Doctor TAYLOR. In several of the New England and northeastern New York localities, where the eradication work was done in areas of considerable size, as much as five years ago, so that there has been time for new infections if new infections were going to occur. The infections that are found in those localities are practically all infections that you can definitely mark as having occurred in 1915 or 1916 or 1917, as determined by the growth of the tree since that infection occurred. Of course, if the disease could spread from one pine tree to another pine tree, the mere fact of an infection being there would negative the advisability of such work, but with the currants and gooseberries out, no infection occurs later, and that initial infection, unless too severe, does not jeopardize the future timber value of the tree.

Mr. ANDERSON. Where you have them cut these gooseberries and currant bushes out, is that the end of it; do they volunteer?

Doctor TAYLOR. A second combing of the area will probably be necessary 5 to 10 years later to uproot the very few bushes that were missed in the initial eradication, and the occasional bird-sown seedlings that may come in. The reinspection five years after of those early eradicated areas, however, discloses a surprisingly small number of bushes needing to come out. Of course, it all depends on the thoroughness with which the initial eradication work is done.

Mr. BUCHANAN. You dig them up by the roots?

Doctor TAYLOR. Yes; they have to come out. The small ones in the looser soils are pulled out by hand. In clay soils they require grubbing, and in some areas of swamp land some species of the wild currants are so thickly present that it pretty nearly requires the denuding of small areas to get them all.

Mr. ANDERSON. What are you doing in the Puget Sound area? Is the work being conducted there in the same way?

CONDUCT OF CONTROL WORK IN PUGET SOUND AREA.

Doctor TAYLOR. Not exactly. Doctor Kellerman had a glimpse of that this summer. I think his observation would be helpful.

Doctor KELLERMAN. Mr. Chairman, the work in Puget Sound region has been confined almost entirely to inspection work, the number of findings of disease inside of the United States being relatively small, the presence of the disease in the Puget Sound region, rather than the amount of it, having been the disturbing factor. At the present time it is clear that the disease has been in British Columbia for a considerable term of years. It does not appear that the disease has been in the State of Washington for a period anything like as long as in British Columbia, probably not earlier than in 1917, as far as Washington State is concerned, and only three diseased trees infected as early as that have been found. The infections, chiefly on currant bushes, have all been found on the edge of Puget Sound or on the coast.

That all goes to show that the infection there is of comparatively recent origin.

I would like to bring out that at the present time plans for handling the Pacific coast region have not been decided upon. It is possible that the infections are so scattering and so recent that an eradication campaign could be carried out. That was our hope at the very beginning of the season. Then, as more and more counties were found infected, we became rather doubtful of the feasibility of an eradication campaign. The continuation of inspection work has not shown a very wide spread of the disease, however, not as wide as we had been led to suppose by the findings of midseason. The question of whether an eradication campaign may be feasible I believe is still an open question. An important conference is now being held, or will be held in a very short time, in Portland, at which both the Canadian and Western States' representatives and people of our bureau will review all of the information available, and the character of support that could be obtained from commercial holders of pine, as well as to again review the magnitude of the Federal interests in the national forests that are likely to be jeopardized; and at that time a more comprehensive plan for the future will be outlined, and if possible agreed upon by all of the parties concerned.

At the present time, you will recall, that the current appropriation is supplemented by a portion of an emergency appropriation that is available during the greater part of the present fiscal year. Approximately \$100,000 of an emergency appropriation given to the bureau because of this unexpected discovery of white-pine infection in the Northwest, is available until March of this present year, giving us in this item \$300,000 to work with instead of the \$200,000 that is shown in the appropriation bill.

Whether it will appear advisable to ask for funds to continue some of the general eradication plans that we had at first proposed for the Northwest, or whether the campaign can not possibly be developed on an eradication basis and must remain on an educational basis, I think will determine whether the present funds are sufficient for all of the blister-rust work that we need to carry on as far as the Bureau of Plant Industry is concerned, or whether it would be advisable to provide additional funds for taking care of the Federal and other interests in the Northwest.

Mr. ANDERSON. How much is going to be spent in this Puget Sound situation now for inspection and other work you are doing?

NEED OF INCREASED FUNDS FOR EXTENSIVE ERADICATION CAMPAIGN.

Doctor KELLERMAN. During this fiscal year approximately \$100,000 will be expended for blister-rust work in the Northwest.

Mr. ANDERSON. An eradication campaign, of course, would involve a considerably larger sum of money?

Doctor KELLERMAN. That would undoubtedly involve a somewhat larger sum than we are spending there now, although I doubt whether it would need to be very much greater. I would estimate somewhere between \$200,000 and \$300,000 as necessary for an effective eradication campaign, which would have to include scouting.

Mr. ANDERSON. You mean for that area alone?

Doctor KELLERMAN. For the area including the States of Washington, Idaho, and Oregon.

Mr. ANDERSON. I do not quite get you. I do not know whether you mean between \$200,000 and \$300,000 for the whole campaign, New England and——

Doctor KELLERMAN (interposing). No, no. I mean only for the Northwest region, in addition to the \$200,000 which we have at the present time.

Doctor TAYLOR. The emergency appropriation available for the year beginning March 1, 1922, and extending through March, 1923, was \$150,000, which covers the whole of the growing season of 1922 and the winter following.

Mr. ANDERSON. Well, so far as your plans go, without the determination of the question of the policy to be pursued in the Northwest, the sum proposed is adequate to continue the work?

Doctor TAYLOR. Yes. This involves a full-speed-ahead program along the lines that we feel sure of in the territory that is ripe for it.

COTTON AND TRUCK CROP DISEASE INVESTIGATIONS.

The next subappropriation on page 84, for the investigation of diseases of cotton, potatoes, truck crops, forage crops, drug and related plants: The estimates provide an increase of \$10,000—this for two purposes—\$2,500 for work on cotton diseases. The cotton disease probably causing the heaviest damage being root rot, regarding the cause of which and the methods of combating not much is known, although work has been done more or less during a considerable period of years.

Mr. BUCHANAN. It is as old as the cotton plant itself?

Doctor TAYLOR. It is as old as the cotton plant itself, and it has increasingly become evident, as closer attention has been paid to the classing of cotton at the source, that root rot, as well as other factors which interfere with the normal growth of the plant and the lint seriously impairs the quality of the lint and reduces the value of what is harvested and baled.

Mr. BUCHANAN. Not only that, it cuts off its production?

Doctor TAYLOR. It cuts off production, and it injures the quality of that which is produced in the root-rot affected plants. It kills the stalk, the boll dries up, and you pick it and it has no staple to it. It causes immature seed and stops production.

Mr. BUCHANAN. How long have you been studying that root rot?

Doctor TAYLOR. In a rather broken way for a number of years.

Mr. BUCHANAN. It is a germ, is it not?

Doctor TAYLOR. It is supposed to be caused by a fungus, but it is one of those fungi which has not yet disclosed its full life history.

Mr. BUCHANAN. Has it ever been called to your attention—this is common notoriety down there that the plant of sorghum planted in those patches where root rot exists in cotton in two or three years would destroy it?

Doctor TAYLOR. Yes. In fact, the only approximate control that anyone has been able to suggest thus far has been the use of the land for grasses, including sorghum or other crops not susceptible to disease, in rotation for a sufficient time to let the fungus measurably die out of the land.

Mr. BUCHANAN. You know the objection to that, do you not? This root rot takes possession of a patch of perhaps an acre over there and an acre over here and another acre over there [illustrating], just in little patches throughout the cotton field.

Doctor TAYLOR. Yes; that is the difficulty.

Mr. BUCHANAN. And you would have the grass patches or sorghum patches scattered all over the field and have the exact line of the root rot.

Doctor TAYLOR. It becomes a very difficult thing, unless you are operating on a basis that would permit the use in other crops of the whole tract that has some bad spots in it.

Mr. BUCHANAN. But the spots are not sufficient, you know.

Doctor TAYLOR. And that is not economically sound in many cases.

I will ask you, Doctor Kellerman, to tell the committee of one recent development that you have been in special touch with in root-rot control that is interesting.

RECENT DEVELOPMENTS IN ROOT-ROT CONTROL WORK.

Doctor KELLERMAN. In the Southwest the root rot has become a very serious factor in the new cotton areas, especially in these areas where the bureau has been fostering the production of Pima cotton—long-staple Egyptian cotton—that is, American Egyptian cotton.

Mr. BUCHANAN. That is in Arizona and California?

Doctor KELLERMAN. That is in Arizona and California. The experiments on the control of root rot, I believe, have progressed further than they have in any of the older cotton areas and we have had during the past two years remarkably successful control by treating infected areas of a field with a solution of formalin—that is a disinfectant used widely; it is an excellent fungicide; furthermore, it breaks down after it has been in the soil a while, so that it does not injure the soil agriculturally at all.

Mr. BUCHANAN. Do you apply that to the soil?

Doctor KELLERMAN. Yes; to date this treatment has been made only in irrigated regions, which simplifies the application of the disinfectant, because the area to be treated can be banked up, irrigation water run onto it, and the formalin added to the irrigation work.

There appears to be no reason, as far as we can see, why somewhat stronger solutions could not be used in connection with plowing or harrowing operations, and actually apply either formalin or some similar disinfectants in regions where irrigation is not practiced. In any case, it has been possible to check immediately, and, from some experimental fields, to completely eradicate the cotton-root rot.

Mr. BUCHANAN. Have you estimated the cost of formalin per acre?

Doctor KELLERMAN. On a field that was badly infected it would probably not be practicable. We have not estimated it on that basis, but on the small quantity of land that needs to be treated when infection is starting it amounts to only a few dollars per acre—two or three dollars to the acre on the fields we have had under consideration. We find that the disease progresses from a central point.

Mr. BUCHANAN. And slowly?

Doctor KELLERMAN. And slowly; and that the area to be treated is only that edge of a yard or more that is actually killing the plants; that that is the place where the fungus is growing and doing its damage; inside of that area or outside of that area no treatment is necessary.

Mr. BUCHANAN. Down home the patches that die from the root rot are solid patches, generally.

Doctor KELLERMAN. That is true, but that is because an infection begins and spreads over a considerable area, and the infected cotton will die as the season continues. Replanted cotton in the center of the area, however, will not be killed.

Mr. BUCHANAN. Are you making any investigation as to the dry culture in cotton States proper?

Doctor KELLERMAN. That is one of the main things that we are anxious to use this additional money for. This investigation that we have been carrying on has been carried on as a side issue to our Southwestern cotton work. We have no funds, without seriously disorganizing other important projects that are yielding important results, to provide for experimental work in the nonirrigated cotton areas.

The very active work on this disease has not been prosecuted during recent years in the Cotton Belt, because all of the leads that have been followed have not been especially productive, and at the present time we have felt that we were getting more benefit out of the money that we were spending on plant-disease control work on other diseases than on the cotton root rot, sometimes called "Texas root rot," because it is a serious matter in Texas.

Mr. BUCHANAN. I know it is. Is it in all the cotton-producing States?

Doctor KELLERMAN. It is more troublesome in the Southern States—in the hotter States.

Mr. BUCHANAN. Have you ever noticed it is worse in Texas on black land than any other?

Doctor KELLERMAN. Yes, it is much more destructive there.

Mr. BUCHANAN. Changing the subject, is this fund the one that carries boll weevil?

Doctor TAYLOR. No, sir; that is in the Bureau of Entomology.

Mr. BUCHANAN. There is no bulletin on this yet, is there?

Doctor KELLERMAN. A paper on this subject is now being prepared. A description of this work probably will take shorter space in the paper that is prepared than the way I have described it.

Mr. BUCHANAN. It will be printed?

Doctor KELLERMAN. It will be printed very shortly. I will see that you get a copy.

INCREASE FOR POTATO DISEASE WORK.

Doctor TAYLOR. The other \$7,500 of the \$10,000 is needed for potato-disease work. The potato crop is now produced under conditions so widely diverse and in regions so far apart and so far from the consumer, who, together with the producer, pays the freight on potatoes in larger measure than on almost any other staple foodstuffs, because of the watery character of the potato that it has reached a

point where the elimination of seed-borne diseases has become vitally important.

The superficial diseases, the fungi which cause scab and troubles of that character on the skin, are under measurable control through the dipping of the seed and the avoidance of limy soils, or the omission of liming the soils immediately before the potato crop is to be grown. But certain of the most destructive diseases—and these have appeared in relatively recent times—both in Europe and this country—their control is much less well understood. They are known roughly as the virus diseases, which it is now known are transmitted from plant to plant by certain insects, the little aphids or plant lice; and it is now known, also, that at least one of these insects overwinters on the rose. This whole virus disease problem as affecting the potato is intimately associated with the production of high-grade seed potatoes.

Much of the more southern portion of the country, including parts of the Corn Belt and most of the territory south of the Potomac River, relies on northern seed potatoes for its planting stock—Maine, New York, Michigan, Minnesota, and Wisconsin.

The strategic place, therefore, of the attack for the control of these diseases is that seed-potato-growing territory. The problem is acute also in California, where the source of supply is either the high altitudes of their own State or Oregon and Washington. A very great interest in this matter has developed under the leadership of the Bureau of Plant Industry, which some 10 years ago suggested the idea of field inspection during the growing season as a basis for certification of seed potatoes, both as to horticultural purity as regards variety and pathological cleanness. So that there were this last year over a million and a half bushels of certified seed potatoes produced, mostly in those Northern States.

But the situation is really critical now as regards the permanence of the certified seed plan; it is a sound idea, one that we are confident is the only way through which these diseases can be controlled. We need more knowledge of the basic facts regarding these diseases as a basis for the field inspection upon which the certification rests. A meeting is to be held in Boston the last week of December of the potato pathologists and certified seed growers of the States to consider this whole question and endeavor to get together upon a more harmonious and uniform plan of certification.

Mr. BUCHANAN. Don't you think the department ought to be very cautious and very certain before it gives certificates?

Doctor TAYLOR. That is realized, and the department has refrained from giving certificates at all covering quality or pathological cleanness of seed. We have not specific statutory authority for that. It is likely that if the name of the department appeared upon such a certificate it would be interpreted as signifying a guarantee of quality, which, under the present conditions, could not be given; and, accordingly, the department has studiously and without deviation refrained from certifying seed potatoes or seed of any kind.

Mr. ANDERSON. Where you have developed the method of control of the disease, do you find that the method is generally adopted—sufficient interest is taken by the people in the production of the disease-free potatoes or other commodities, so that your methods are adopted?

Doctor TAYLOR. If it becomes clear that it pays. Some one has to go forward and do that thing at the increased expense usually of money and practically always of labor, that is involved. The question of the permanence of the adoption of such a practice often is influenced by whether very destructive seasons occur somewhat early in the operation of the plan or not; for example, in the case of the control of brown rot of the peach in the Georgia peach district, a plan of control was worked out and demonstrated and adopted and succeeded, and was practiced for several years. A dry season came along when unsprayed peach trees yielded just as good a product as sprayed ones, and there were two or three years in which the weather was relatively unfavorable for the disease. Then there came, two years ago, a continuously showery season in that territory, when brown rot conditions were favorable, and the crop went bad to an extent that caused losses that were almost total in the case of large enterprises and the growers were in a mood for adoption of better practices. The work that was put on there as a result of their appeals for a redemonstration, with some further improvements which had become possible through knowledge secured later, they adopted and this year adhered to a spray schedule in a very satisfactory way and almost universally. Much depends on whether early in a campaign a year occurs when the man who does not adopt the methods does just as well as the one who does, because it is difficult to hold him to a schedule of increased expenditure and action if he can not see that it pays.

FOR INVESTIGATING THE PHYSIOLOGY OF CROP PLANTS.

Mr. ANDERSON. Doctor Taylor, you can commence with your next item.

Doctor TAYLOR. The next item is on page 86, "For investigating the physiology of crop plants and for testing and breeding varieties thereof," in which the estimate provides an increase of \$10,000 for enlarging the date-production investigations in the Southwest.

DATE-PRODUCTION INVESTIGATIONS.

This is applicable chiefly to California, Arizona, and as a minor feature to the Rio Grande Valley of Texas. The industry is coming along in fairly good shape. The Deglet Noor variety is succeeding well in the Coachella Valley of California. In the great Imperial Valley, in parts of which they have more humid weather than the Coachella Valley, the Deglet Noor has not proved well adapted.

There is now a goodly supply of offshoots of an Egyptian date variety, the Saidy, which is earlier in maturing and more promising than Deglet Noor for the Imperial Valley.

We have no experimental collection there and the people are very desirous of definite date work there. Telegrams came in this week tendering, without cost to the department, a tract of land for that purpose in the Imperial Valley, in the hope that this work can go forward.

Mr. ANDERSON. Well, are you going out there and start a lot of experiments on land which is furnished free, and thereby develop a tract for private parties, or are you going to have to buy it?

Doctor TAYLOR. The arrangement with respect to the use of the land and the shape in which the work would be undertaken is entirely open as yet. There is nothing determined with regard to that. The present holding at Indio is on land which the Government holds in fee.

The larger part of the commercial scale effort, however, is handled under contracts for a period of years upon privately owned land, under contracts which reserve to the department a share of the offshoots and protect the department's right for experimental uses. In most cases the cost of the trees—that is, of the offshoots imported for those plantings—is borne by the owner of the land, so that the Government expenditure is for the expenses of supervision and experimentation, such as labor, salaries, and supplies.

Mr. BUCHANAN. How long do date plants last after they are set out?

Doctor TAYLOR. We have not in this country had them long enough to know, but in the Old World, barring destructive insect trouble, anywhere from 100 years upward.

Mr. BUCHANAN. I did not care anything about any specified length of time, but just wanted an idea.

COMMERCIAL SCALE COOPERATIVE AGREEMENTS FOR DATE CULTURE.

Mr. ANDERSON. Where the owner furnishes the land and pays for the shoots, or offshoots, or whatever you call them, for a certain period, then you turn the whole business over to the owners?

Doctor TAYLOR. Yes. In such cases, the owners bear the entire cost of the culture and labor and all of that. That is what we would call commercial scale cooperative contract experiments.

Our variety collection work, however, we do maintain upon land either owned by the Government or by the State, so that the ownership of the trees is in the Government.

Mr. ANDERSON. Well, what do you propose to do, to add to the work you are now doing under this? Do you have any stations in the Imperial Valley?

Doctor TAYLOR. We need one station in the Imperial Valley, and we need very much an additional man scientifically trained who can be out there throughout the entire year. Our field personnel at the station has of necessity been headed by what we would call a practical man, a man who has accomplished very excellent results, but whose full time is occupied with the looking after the cultural details and so on. There are lines of systematic experimentation that we have to protect through the addition of a man who is trained to do that work.

Mr. ANDERSON. Are you still bringing in offshoots over from Egypt?

Doctor TAYLOR. We brought some in during this last spring, a considerable quantity, most of which were financed by the planters under these commercial scale contracts, although certain of them were brought in for addition to our varietal collections.

CONSUMPTION OF DOMESTIC-GROWN DATES.

Mr. ANDERSON. What is the commercial production now?

Doctor TAYLOR. I can not give you the figures.

Mr. ANDERSON. Well, it is becoming quite considerable.

Doctor TAYLOR. Considerable, although not yet large in comparison with the very heavy importations. And the production so far is chiefly consumed in the Southwest?

The estimated production of dates in California in 1922 is 300,000 pounds. That of 1921 was estimated at 150,000 pounds, the crop of that year having been curtailed by untimely rains.

Mr. ANDERSON. It is.

Doctor TAYLOR. Chiefly.

Mr. ANDERSON. I have never seen any on the market anywhere, and I was wondering whether the distribution had gotten outside of the districts where they are grown.

Doctor TAYLOR. Secretary Wallace called my attention within the last few days to certain jars of fancy packed California dates in a fruit store at Thirteenth and F Streets—Brownley's store.

A peculiar situation exists just at the moment with respect to our probable date importations this year as a result of the trouble at Smyrna. The fig movement from the Smyrna district, which is the most important table fig commercial production district of the world, has been seriously impaired by the destruction by fire of the packing houses, including their contents, so that the fig shipments will be subnormal.

The date importation, which in general is handled through the same channels of trade and to an extent is interchangeable with the fig, will probably be materially increased. They come from Egypt, Algiers, and Mesopotamia, and there is every indication that there will be an abnormally large importation of dates to balance this shortage of imported figs.

Mr. ANDERSON. Are there any figs produced in this country?

Doctor TAYLOR. Yes, sir; the California fig production is increasing substantially and—

Mr. BUCHANAN (interposing). Yes, and all over south Texas.

Doctor TAYLOR. I beg pardon?

Mr. BUCHANAN. There are a great many produced in south Texas, too.

Doctor TAYLOR. Yes; they are used for canning—chiefly canning and preserving.

Mr. BUCHANAN. Yes.

SOIL BACTERIOLOGY AND PLANT NUTRITION INVESTIGATIONS.

Mr. ANDERSON. All right. We will take up the next item.

Doctor TAYLOR. The next is the subappropriation on page 88:

For soil-bacteriology and plant-nutrition investigations, including the testing of samples, procured in the open market, of cultures for inoculating legumes, and if any such samples are found to be impure, nonviable, or misbranded, the results of the tests may be published, together with the names of the manufacturers and of the persons by whom the cultures were offered for sale, \$50,000.

Mr. ANDERSON. Well, we will pass that over without any discussion. There is not a change in that.

Doctor TAYLOR. No, sir.

SOIL-FERTILITY INVESTIGATIONS.

The next is the subappropriation for soil-fertility investigations into organic causes of infertility and remedial measures, maintenance of productivity, properties, and composition of soil humus, and the transformation and formation of soil humus by soil organisms, \$45,060.

That is the same amount as was asked for last year.

CROP ACCLIMATIZATION.

Page 92:

For acclimatization and adaptation investigations of cotton, corn, and other crops introduced from tropical regions, and for the improvement of cotton and other fiber plants by cultural methods, breeding, and selection and for determining the feasibility of increasing the production of hard fibers outside of the continental United States, etc., \$132,500.

COTTON VARIETY IMPROVEMENT WORK.

There is an increase asked there of \$20,000. The increase is desired for enlargement of the cotton variety improvement work, with special reference to the southeastern conditions, where, at present at least, until the prices began to go up, exceeding depression because of boll-weevil trouble and low prices and low yield has existed.

It is desired to develop at some point in the southeastern territory a nuclear variety improvement unit for pure-seed production activities, somewhat comparable with that which has for some years been maintained at Greenville, Tex., where the Lone Star variety of cotton has centered, which has become a very important feature of cotton production there.

The Southeast is disheartened, to an extent disorganized, in its whole cotton-production effort, and the way out appears to necessitate as one important thing the concentration of the production upon fewer varieties.

Mr. ANDERSON. Good.

Doctor TAYLOR. Which can be grown, ginned, marketed, upon a standard-quality basis, and the time is ripe for that work now, we feel.

Mr. BUCHANAN. Do we not have many private individuals engaged in trying to get such a cotton?

Doctor TAYLOR. Yes; and some with distinct success, with very marked success, and upon a fairly large scale.

Mr. BUCHANAN. And there are several, even, in the Texas territory that have varieties of cotton that is just as much in demand as the Lone Star?

Doctor TAYLOR. That is quite possible. That presumably will be so. The department has no monopoly of the ability in the country in the field of cotton improvement or production. The department has a certain responsibility, we feel, and a certain degree of capacity to handle and in a measure lead the way in that work.

Mr. BUCHANAN. I was just wondering whether or not in all of these things, corn, cotton, dates, and everything else, if it would not be more desirable that the department arouse an interest in the development along an improvement, some improvement line, and then leave it to private enterprise.

Doctor TAYLOR. Theoretically, that is unquestionably true. The exact time when the child can safely be turned loose in the jungle is always a matter of judgment.

Mr. BUCHANAN. Of course, I did not mean to stop the study of the problem at all, but to stop those actual farm demonstrations and farm ownerships, or partnership in farms for demonstration purposes. I did not mean to stop the study in the office of things of that sort.

Doctor TAYLOR. I understand you. I think our minds meet on that point.

In a case like this, where it involves not merely the convincing of the leading minds of a country, we will say, as to the advisability of it, but it means the convincing of the average grower or in some way the accomplishing of practically uniform practice throughout a geographic community. It is going to take considerable time to get that idea over in this country, where we have developed on an individualistic basis, and we have not yet learned how most effectively to cooperate, nor why you cooperate in such things.

Mr. BUCHANAN. Well, in my country I have never seen a better development of enthusiasm for improving the varieties of cotton since many days, and I have been fooling with cotton all of my life, raising it, and every farmer of any intelligence is hunting the best cotton seed and they are inquiring about them and discussing them and have pamphlets from the different cotton raising concerns supposed to put out improved varieties of seed, etc., and one is trying one seed and one another, and there is a well-developed enthusiasm for improved varieties in my territory.

Doctor TAYLOR. That has been a very marked improvement in that direction during the last two or three years.

Mr. BUCHANAN. There certainly has been.

Doctor TAYLOR. And one explanation of that, we think, is the demonstration in the case of Lone Star, as an example, that it pays, and also the demonstration there of the practicability of maintaining upon a large scale, a production of pure seed that is suitable to plant in that territory.

This does not mean that the Government is going to maintain a continuous production of seed, but that we have got to demonstrate, convincingly, that it can be done, and that the essentials are a few things, without which effort will be desultory and ephemeral and will not maintain permanent success.

Mr. ANDERSON. It is, I suppose, reasonable to assume that self-interest in people will lead them to choose the best varieties and most efficient methods, but my observation is that that assumption is not a well grounded one. So, I suppose we will have to go on with the propaganda to create intelligent self-interest as long as we have any people in this country, and that is the one thing I suppose you are doing under this item.

Doctor TAYLOR. Yes, sir; especially through proving by means of varieties and facts a basis for sane propaganda, and discussions. It is going to take a long time to put it over throughout the whole territory.

The idea is not restricted to cotton, by any means. It is equally true with respect to potatoes. It is almost equally true with respect to wheat, in particular districts, but the idea is sound; that is, it is economically sound, as well as agronomically sound.

Mr. ANDERSON. Do you have anything further on this, Mr. Buchanan?

Mr. BUCHANAN. No.

DRUG AND OTHER PLANTS.

Mr. ANDERSON. Well, we will take up the next item.

Doctor TAYLOR. The next item is on page 94:

For the investigation, testing, and improvement of plants yielding drugs, spices, poisons, oils, and related products and by-products and for general physiological and fermentation investigations.

Mr. ANDERSON. There is no change in that item.

CROP TECHNOLOGICAL INVESTIGATIONS.

Doctor TAYLOR. No. The next item is on page 96:

For crop technological investigations, including the study of plant-investing nematodes.

NEMATODE DISEASE INVESTIGATIONS.

The estimates include an increase of \$10,000 for nematode disease investigation. The need for work here has broadened, as during the last year it has become evident that many of the root troubles of peach and other fruit trees in portions of California, as well as with clover in Idaho, as has previously been known with respect to sugar beets in part of the irrigated territory, is attributable to nematodes, which previously have been attributed to soil exhaustion and other causes.

These nematodes which cause the root rot of the fig and peach in the Gulf territory, and in some places in cotton, have been proven to be destructive to many other crops.

There is one other phase that has assumed importance which only indirectly is related to plants, namely, the part that these organisms play almost certainly in the control of certain insects which damage crops, like the grasshopper.

It has been found that certain nematodes are apparently the controlling parasites, which hold the grasshopper increase in check and reduces in certain parts of the country at least the grasshopper damage to crops.

Now, the question that emerges is whether it may not be possible, through proper guidance and direction of these parasitic nematodes, to accomplish a sufficient control of grasshoppers to reduce the epidemic phase of grasshopper injury to crops. That is merely a suggestion. At present, it has not been put in effect.

Mr. ANDERSON. I suppose I ought to know, but will you tell us what these nematodes are? Is it a general term that covers a great variety of bugs?

Doctor TAYLOR. It covers that group of little, but visible, organisms, sometimes known as eel worms, of which the hookworm, which causes the human hookworm disease, is one. There is a very large number of species of them. They have not been very much studied.

Mr. BUCHANAN. Are they worms or bugs?

Doctor TAYLOR. They are worms, and they have not been very much studied until recently. They are widely prevalent in those parts of the country where the soil does not freeze deep or hard in winter, so that they live through the winter.

They are troublesome in greenhouses in the North, and it has become evident during this last summer that they have obtained lodgement in the open ground in various places as far north as the Great Lakes region.

Mr. BUCHANAN. You would not call a worm that is large enough to cut a bean stalk down a nematode?

Doctor TAYLOR. No; these are little fellows. You can barely see them with the naked eye, but if you want to get their facial expression you need a magnifying glass.

Mr. BUCHANAN. Some are injurious and some are beneficial?

Doctor TAYLOR. Some live on grasshoppers.

Mr. BUCHANAN. And some of them eat other things?

Doctor TAYLOR. Yes. That phase is very new. If I were not here this afternoon, I would be in Doctor Cobb's laboratory looking over some grasshopper corpses that he has been working with.

I would like to remark that in this recent development in connection with these plant-disease organisms, in the work on the nematodes affecting grasshoppers there is a close cooperation maintained with the Bureau of Entomology, and there is no overlapping or duplication—the nematode work being done by the Bureau of Plant Industry and the insect work by the Bureau of Entomology.

Mr. ANDERSON. I do not know whether this is the place to bring it in or not, but I think that a year or two ago you made some estimate with respect to some work on clover. I do not know whether you even got the money or not. But has there been any development in connection with clover seeds?

CLOVER GROWN FROM EUROPEAN SEED.

Doctor TAYLOR. There has been this rather startling development during the present season, as regards the behavior of clover grown from European clover seed imported from the Mediterranean region, where lots of seed obtained as near to definite sources of production as we could get them without sending a man there actually to collect the seed, were planted in contract with American-grown seed plots at Arlington Farm and in several States, particularly in the corn belt and lake region, where during the mild winter of a year ago there was no perceptible difference in the behavior of the crop. Good stands were obtained at the seeding time in 1921. They came through the winter of 1921-22 without material difference in growth or stand. The first cutting of hay in 1922 was substantially alike, and it looked as though one seed was as good as the other. Within three weeks after the mowing at Arlington Farm, however, practically every plot of clover grown from the south European clover seed showed a destructive development of a leaf disease which before the end of the summer had killed off from half to two-thirds of the stand, in contrast with the plots from American-grown seed, which stood through in good condition, although showing some slight leaf injury from this disease. This means apparently that we have got both the question of winter tenderness, which had come up before, during

severe winters without a snow blanket to protect the plants, and we have got this summer disease susceptibility to look out for in connection with foreign clover seed.

Of course, the difficulty at present is that we have not yet developed a home-grown supply of clover seed adequate for our needs, and so there is a continuing large importation whenever the price differential justifies.

Mr. ANDERSON. I noticed this summer when I was home quite a number of clover fields that appeared to have the leaves covered, or appeared to be covered with a sort of a white mold. A great many or some fields were almost white with it.

Doctor TAYLOR. That mildew was unusually prevalent this year. It was at Arlington Farm, and was more conspicuous on clover from American-grown clover seed than on the South European. It does not, so far as has been ascertained, through feeding tests and observation, materially injure the quality of the forage. It probably does reduce the quantity somewhat. It does not kill the plant. It appeared to be a seasonal, climatic result of weather which encouraged the growth of this fungus, previously unnoticed or unimportant.

FOR STUDYING AND TESTING COMMERCIAL SEEDS.

On page 98 is our seed laboratory paragraph, in which there is no change in the estimates.

Mr. ANDERSON. I think you referred last year to some development in connection with the buying of this seed to indicate its character, variety, or something. I would like to have you tell us something about that, whether anything has developed from it.

Doctor TAYLOR. The practical way of informing the American farmer as to what the clover seed is that he is buying, as between domestic and imported seed, appears to be through a requirement of coloring of the imported seed before entry. Proposed legislation has been agreed to in principle by the leading representatives of the importing seed trade. I believe the department has not yet submitted a specific draft of the bill, but has made the suggestion to the committee that that would seem to point the way out.

Mr. ANDERSON. Admitting that the imported seed may be just as good or even better than the domestic variety, isn't the discrimination of this product upon the sole question of whether or not it is imported wholly immaterial, and almost a fictitious one? The man who buys seed is not especially interested in whether it comes from this country or some other, if it is just as good as what he gets in this country. What he is interested in is in getting good seed, is it not?

Doctor TAYLOR. That is his interest. The difficulty at present is he has no way of determining at all what the climatic endurance of that particular lot of seed is as determined by the conditions under which it is grown.

Mr. ANDERSON. Well, as a practical matter, aside from that, it would give the importer and the farmer an opportunity to express his prejudices, well grounded or not, against the foreign seed.

Doctor TAYLOR. Yes, sir.

Mr. ANDERSON. And I would imagine that it would very materially reduce the use of imported seed.

Doctor TAYLOR. It would tend to encourage the production of an adequate supply here, through the development of preference—intelligent preference on the part of farmers for home-grown seed.

Mr. ANDERSON. Does this item include your experimental imports?

Doctor TAYLOR. The import-seed law administration comes under this item. This does not include foreign seed and plant introduction.

Mr. ANDERSON. That is what I wanted to know. I thought not, but I wanted to be sure.

FOR INVESTIGATIONAL WORK IN THE IMPROVEMENT OF CEREALS.

Doctor TAYLOR. On page 100 is one of the most important sub-appropriations of the Bureau of Plant Industry or of the department, this being the one which covers the investigational work in the improvement of cereals, including corn and the methods of cereal production.

It includes the investigational work on the diseases of the cereals as well as on the agronomic and plant breeding experimentation. It also includes under the proviso the funds for the barberry eradication campaign, now under way in 13 of the principal wheat-growing States including the spring-wheat States where the black-stem rust of wheat has been most destructive.

The change in the estimate involves a reduction of \$150,000 in the money provided for barberry eradication, but an increase of \$25,000 for investigational work outside of this proviso and the transfer from the subappropriation for cereal-disease control previously referred to in connection with the first paragraph of \$15,000, which heretofore has been used in cereal-disease control work, and it is desired to devote that to cereal-disease research work especially.

The net change, therefore, in the money carried by the subappropriation is a decrease of \$110,000, all of which comes out of the barberry-eradication reduction, \$25,000 of new money going into cereal research.

Mr. ANDERSON. Let me ask you if in connection with that \$15,000 which is transferred from the cereal disease item on page 102, do you expect to continue the same work that was done under that item, or is it merely a transfer of that work?

Doctor TAYLOR. Yes; work in that same general field. I will ask Doctor Kellerman to elaborate on that a little, so that it will be clearly before the committee.

CEREAL-DISEASE WORK TRANSFERRED.

Doctor KELLERMAN. Mr. Chairman, you will probably recall under the cereal-disease control item there was inserted in the appropriation this amount because of the discovery of two diseases—flag smut and take-all, in the Middle West.

The investigations on the seriousness and the general spread of take-all have indicated that it is a disease that spreads very slowly. While it is a serious disease, it is a disease that does not need to be handled as an eradication campaign. It can not be so handled, since it occurs in several wheat areas. It is a research problem rather than

an eradication problem, and for the last few years has been handled in connection with our investigational work on cereals, the funds being retained in this cereal-control item.

In addition to that, the flag-smut problem was first taken up with the hope of the eradication of flag smut from the one county in which it was believed to occur in Illinois, in Madison County, but it does not appear that we will be able to have any reasonable success. We are planning, therefore, to change that also into a control instead of an eradication type of campaign.

And in connection with that, also, the research development rather than the employment of inspectors or scouts is fundamental.

In cooperation with Illinois, Missouri, and Indiana we are carrying out research phases which have been deemed best here, and we hope to continue this, with the expectation of establishing throughout this region varieties of wheat that will yield just as well as those previously grown but which have a complete resistance to flag smut.

As the situation now stands, it seems to us that that is the only way that this disease can be checked or that the spread of the disease can be checked.

Mr. ANDERSON. Well, can you maintain along these programs a program to confine the disease in the areas in which it is located? Is there any quarantine?

Doctor KELLERMAN. Federal quarantine has never been placed on this area. Quarantines on the part of Illinois, in so far as flag smut is concerned, beyond Illinois, in so far as take-all is concerned, have been effectively maintained, with the gradual leaping out of flag smut beyond the quarantine area. It would not appear, therefore, that the quarantine policy is likely to be of any great benefit. The opportunity for wind dissemination, the impossibility of safeguarding, even if we knew of the distribution of spores through common carriers, motors, wagons, farm implements, and other things that are likely to move in that general section of the country, make it now look as though the control of the disease by the substitution of resistant wheats is about the only thing that is likely to be effective at all. Quarantines are still under way, but our expectations are that they will be rapidly loosened instead of increased in severity.

INCREASE FOR INVESTIGATIONAL WORK NEEDED.

Doctor TAYLOR. The need for the enlargement of the amount available for the investigational work upon the cereals, aside from the cereal-disease work, is acute for the reason that for several years past the investigational work has stood still, financially, the increases of funds having been for the disease-control work. The result is that the highly important constructive plant-breeding work has lagged somewhat behind.

It is of the utmost importance that this should be built up. The \$25,000 involved there is desired, \$10,000 for enlargement of the corn-production work, covering this whole field of varietal improvement and adaptability determination of corn with special reference to the Corn Belt and \$15,000 for the breeding and introduction of drought resistant and winter hardy type of small grain.

One very important thing in wheat production is the pushing of winter-wheat production just as far north as winter conditions permit.

for winter wheats come earlier into harvest and are less likely to be damaged by hot winds or by black stem rust, for that matter. It is a surer crop than spring wheat and a heavier yielding crop per acre on the average.

Mr. ANDERSON. Where it is grown in the North, is it hard and does it contain as much gluten as spring wheat?

Doctor TAYLOR. It is not as hard as spring wheat, but has a total food value per acre in excess of the hard spring. It is not to be expected at all that we ever will have winter wheats that will entirely displace spring wheat in our more northern territory. We do not know of any types of wheat that appear to possess hardiness sufficient to stand the winters of the northern Great Plains area after you get up into the Dakotas, up to North Dakota, particularly, but there is reason to believe that there are cold enduring types of wheat in the Asiatic interior that are quite beyond anything that we have yet. The progress that has been made in the breeding work with the material that we have encourages the hope also that material increase of winter hardiness can be accomplished in the case of wheat that would make it possible to push winter wheat production considerably farther north than it ever has been in this country. That would be an important and very desirable thing to accomplish. On page 102, the cereal disease control item——

Mr. ANDERSON (interposing). Did you finish this?

Doctor TAYLOR. I beg your pardon. Do you wish some information upon the barberry eradication?

Mr. ANDERSON. I wanted some information on barberry eradication. But I understand that this \$25,000 is going to be used entirely on this wheat business.

Doctor TAYLOR. On wheat and corn.

Mr. ANDERSON. Wheat and corn. I want a good deal of information on this barberry eradication plan.

Doctor TAYLOR. I would suggest that Doctor Kellerman has a map here that will help you to understand it.

BARBERRY ERADICATION.

Doctor KELLERMAN. Mr. Chairman, the work of barberry eradication was considerably enlarged during the past fiscal year, because of the increased funds put at the disposal of the bureau by the last Congress. A very small map that I have here will be the easiest way for you to visualize, approximately, the progress of the work.

The plans of the activity have been to center the inspection and eradication work in those areas where losses have been severe, where the escape of the barberry, if it occurred quite generally and there were delays in eradication, would, therefore, result in a very much harder campaign as each year went by. Accordingly, the most critical inspections and the heaviest expenditures have occurred in the central portions of the area of the 13 States——

Mr. ANDERSON (interposing). Will you name the States?

Doctor KELLERMAN. They are North Dakota, Minnesota, South Dakota, and Iowa. The inspections there have been conducted in about one-half, a little bit more than one-half, of the areas that we think must be very carefully inspected and inspected on a farm-to-farm basis before we can assume that the eradication work has been accomplished.

A little bit more than approximately one-half of the areas of these States, more than a half of the areas of Michigan, Wisconsin, Illinois, Indiana, Ohio, and Nebraska, remain to be critically inspected.

In addition, we find that the sprouting of the barberries is a very troublesome factor. Even after a farm-to-farm survey has been completed, we will probably have to make a reinspection a year or two later to find the sprouts which farmers are likely to overlook.

The belief in the success of the barberry eradication in preventing epidemics and destructive epidemics of stem rust, I think is now practically universal.

Mr. ANDERSON. Well, my observation does not agree with that at all. Of course, my section of the country does not raise much wheat, but I do not think that you will find one farmer in ten out there that takes any stock at all in your barberry business.

Doctor KELLERMAN. Well, I am very much surprised to hear that because so far as I am in touch with this, which is, of course, largely second hand—I have met a few persons from where the work has been conducted, and those as a general rule, I think, are the larger farmers, and therefore they may not represent the sentiment of the farm group as a whole. But taking the Farm Bureau, which is a fairly direct representation of the sentiment of the farmers, taking our correspondents, the reports of the barberry scouts who are in most intimate contact with the farmers, I think that there is no question but that the men that we are in contact with are most sympathetic to this work, and the overwhelming majority of them believe in it.

Mr. BUCHANAN. Now, let me ask you a question there. How long have you been fighting this black stem rust?

Doctor KELLERMAN. Well, through barberry eradication, you might say, since 1918.

Mr. BUCHANAN. How long have you been fighting it altogether—8, 10, or 15 years?

Doctor KELLERMAN. Oh, 50 years.

Mr. BUCHANAN. All right, then, from your 50 years of experience, has the department arrived at a conclusion that barberry eradication will eradicate the stem rust?

Doctor KELLERMAN. Not that it will eradicate stem rust as a disease, but that it will prevent the destructive epidemics that have caused such heavy crop losses as occurred in 1916, for example.

ERADICATION OF BARBERRY OF GREAT ECONOMIC VALUE.

Mr. BUCHANAN. Then, has the department arrived at a conclusion that the eradication of the barberry bush will be itself justified, from an economic standpoint?

Doctor KELLERMAN. From our study and investigation, that is what we generally expect.

Mr. BUCHANAN. So that whether the farmers believe in it or not, would not amount to anything except that you would have their cooperation in it if they did, and if they did not believe in it you would not have their cooperation, but it is up to the Government to go on with the work and prove it to them.

Doctor KELLERMAN. It would not change our belief. We believe so. We are thoroughly convinced of this as a national necessity.

Mr. BUCHANAN. Yes.

Doctor KELLERMAN. We could not succeed in a campaign of this sort without almost the unanimous support of the farmers in the territory in which we are carrying it on.

Mr. BUCHANAN. I realize that, and I say if they do not believe in it, then it is up to the Government to go on and demonstrate it and prove it to them and convince them of its value.

Doctor KELLERMAN. Yes, sir.

Doctor TAYLOR. Mr. Anderson, I think the results of an inquiry made in the European countries this summer by Doctor Stakman in connection with this work which Doctor Kellerman has been telling you of, would be helpful if Doctor Kellerman will present them to you.

Mr. ANDERSON. All right; let us have it.

Doctor KELLERMAN. This is right in connection with the attitude of the farmers in European countries toward barberry eradication for the control of black stem rust. We have a report here in connection with that inquiry. It has not been issued in any formal publication, but I think that it is quite illuminating as to what the consensus of opinion is in those countries where they have been at this considerably longer than we have in their efforts to control the disease.

Doctor KELLERMAN. Mr. Chairman, Doctor Stakman was sent to Europe—

Mr. ANDERSON (interposing). By the department?

Doctor KELLERMAN. By the department; yes, sir. He was sent to Europe because of the feeling that, although we had the technical reports of the work carried on in these countries, the lack of first-hand knowledge was a handicap in explaining the results in these foreign countries. Denmark, particularly, had reported unusually favorable results in control of black-stem rust through barberry eradication, but no American representative had ever examined the conditions in that country.

Doctor Stakman made a thorough study, in so far as the seasons permitted, not only in Denmark but in France, Austria, Hungary, and Germany, as well as England, and found that the feeling in those countries, in western Europe throughout, was general, not only among the specialists but among the farmers as well, that the common barberry had been almost the sole cause of their serious troubles with black-stem rust, but that at the present time the black-stem rust was not, and for some years had not been a serious question, because through the elimination of the common barberry, and in most of the countries you might almost say, eradication by barberry eradication laws, black stem rust had disappeared.

Mr. ANDERSON. What relation is there between black stem rust and red rust?

Doctor KELLERMAN. There is just a difference in the season of the year. Well, of course, there is leaf rust. That is a totally different species. It is, therefore, a little bit confusing to try to make a distinction between what is known as black stem rust, which is a rust which is red in the early season of the year, and the leaf rust, which is commonly spoken of as red rust.

Mr. ANDERSON. Is the red rust a destructive rust?

Doctor KELLERMAN. That has not been considered a destructive disease, although during the past two years, because of climatic con-

ditions and heavy infestation, it has led a good many wheat growers to believe it is.

Mr. ANDERSON. Well, I think that is partially responsible for the feeling on the part of some farmers that the barberry eradication has not produced results. In other words, they make no distinction whatever between black rusts and red rust. It is all rust and if they get this red leaf rust and it spoils the crops or damages them, they make no distinction with regard to that at all. They just assume that the eradication of the barberry has failed to eliminate rust. That is my impression as to one of the reasons why the farmers are more skeptical about the relation between barberry and rust than they would be otherwise.

Doctor KELLERMAN. I think that is true, Mr. Chairman. There is one thing further. It is not only a different species of rust, but other totally different species are considered by them as stem rust. I know that farmers have considered wheat scab, which does not show any of the same symptoms except that you get your swiveled grain, as rust of wheat scab infections. I know that many farmers have said all of the time that it was nothing but stem rust or black rust, and as such they have actually considered it, when there was not any black rust on their plants at all. And there is a very great confusion of ideas about these different diseases, but no disease has shown the epidemic character of the black rust. There is no disease of wheat that we have now that has been able to destroy such enormous areas of grain in such a short time as during the 1914 and 1916 epidemics of black stem rust. There have been, it is true, local epidemics even in areas that have been reported as cleaned up during the past year. As far as I am aware, every one of those areas has on reexamination been found to have been not perfectly cleaned. There is scattered an occasional barberry.

Mr. ANDERSON. Has it been definitely demonstrated that if we get rid of the barberries there is not some other plant on which this stuff will winter over?

Doctor KELLERMAN. Not north of the Nebraska line. I think that it is safe to say that in the average winter the spores will not live over on other plants. In the southern plains several species of native grasses will carry the rust over winter, but in the Northern areas that we commonly refer to as the spring wheat areas black stem rust can over-winter only on the leaves of the common barberry. There are two or three species of barberry and of mahonia that can carry the rust over winter; these are all used only as ornamentals. Generally speaking, the common barberry is the only plant that has been widely used and the only one that has been planted under such conditions that it is beginning to spread as a wild plant. From the standpoint of the rust-control campaign, therefore, the common barberry is the only important factor.

Mr. BUCHANAN. Is that the north Nebraska line?

Doctor KELLERMAN. Yes; the spring wheat area shown on this map [indicating] will have epidemics of black stem rust if the barberry is not completely eradicated. In the South the rust will winter over on native grasses, but, as you know, black stem rust is not a very serious factor on winter wheat.

Mr. BUCHANAN. You say that you would not find over-wintering spores north of the Nebraska line?

Doctor KELLERMAN. Yes, sir.

Doctor TAYLOR. This map here will show.

Doctor KELLERMAN. The 13 States, all of which produce some spring wheat, are the States in which this campaign is of the greatest importance.

Mr. BUCHANAN. Well, are all of those north of the Nebraska line?

Doctor KELLERMAN. No; Nebraska is included.

Mr. BUCHANAN. Is that the north or south Nebraska line?

Doctor KELLERMAN. In many winters the north half of Nebraska, or possibly all of Nebraska would be cleaned up through the severity of the winter. In some winters even the Nebraska line might be a little too far south to be the dead line on spore over-wintering, but in that general area there is a line that waves up and down from season to season. In that general area the eradication of the common barberry is undoubtedly a necessity if wheat growing is to attain its maximum productivity.

There is one little comment here in Doctor Stakman's report that I would like to read:

During a 17-mile automobile trip near the fens of England not a trace of black stem rust was found except near three barberry bushes. Again, in Wales, not a trace of the rust could be found, after driving for a great many miles, except on several farms where there were barberries. In fact, the relationship here was so clear that it was possible easily to locate the barberry bushes by tracing the rust to its source. Most of the plant pathologists of England agree that black stem rust can not exist there without the common barberry. The same thing seems to be true throughout most of France.

Mr. BUCHANAN. In those countries, how do the climatic conditions compare with the climate north of the Nebraska line, or south of the Nebraska line?

Doctor KELLERMAN. The climatic conditions would be pretty much the same as in Nebraska, except that the extremes are not so great.

Mr. BUCHANAN. Well, does it get as cold in Nebraska as it does there?

Doctor KELLERMAN. It gets colder in Nebraska. It gets colder in Nebraska than it does in those countries, except in occasional areas in northern France. It would compare pretty favorably with Austria and northern Germany and Denmark. Denmark would be colder than Nebraska.

Doctor TAYLOR. Their summers would generally be cooler than Nebraska. They are too cool for corn. They are not as far from the ocean as Nebraska, and they, therefore, have less hot weather.

Mr. BUCHANAN. I understood the chairman to say that there was going to be a delegation down here to ask for a large increase in this appropriation. Is this as much as you can use economically and efficiently?

Mr. ANDERSON. Before you answer that question, let me——

Doctor KELLERMAN (interposing). That, I think, is a rather difficult question to answer.

Mr. BUCHANAN. That is the question by which we are to be guided in making appropriations under this act.

Doctor KELLERMAN. I think that the question as to the extent to which it is advisable to expend money is a question that would have to be determined on other grounds also.

Mr. BUCHANAN. It should be determined alone on economic reasons.

Doctor KELLERMAN. I think that there is no question but that the money that we have spent this year has been a wise expenditure and that it would not represent the most economic expenditure even yet. We are practically certain to secure a considerable augmentation to our funds from various States and possibly private subscriptions.

I doubt if the total that can be assembled from all of these sources will be a fund that will be so large that it would weaken the organization to handle it. It is always dangerous to try to develop an organization so very rapidly that we can not select the right kind of personnel to handle the work. We have not expanded this organization too rapidly. It has never been expanded at a rate that has made it necessary for us to take anybody on whom we were in the least doubt of. It could be doubled easily without any risks of breaking down the efficiency of the personnel, and I believe that the more rapidly we get this work done, the cheaper it will be for the country.

Mr. BUCHANAN. Let me ask you this: Does the Government put in the actual labor in the field in digging up these barberry bushes?

Doctor KELLERMAN. No; but much of it is done by the men, because they can get the support of the farmers and get them to do the work more quickly by showing them just how to do it in the easiest and most thorough way.

WORK PERFORMED UNDER FEDERAL AND STATE SUPERVISION.

Mr. BUCHANAN. Are these barberry bushes dug under the personal direction and supervision of the employees of the department?

Doctor KELLERMAN. In a very large number of cases, that is the case. It would be in the majority of cases, I would suppose, that the bushes are dug up under either State or Federal supervision.

Mr. BUCHANAN. When you say State or Federal supervision, do you mean to say that the State or Federal officers go out with the farmers and take a pick and dig up these barberry bushes, or is it done by the farmers and then do the farmers report back that they have done it; now, is that the way it is done under their supervision?

Doctor KELLERMAN. No; in cases of that sort the farmer and his men go out and he inspects it.

Mr. BUCHANAN. That is just what I am trying to get at.

Doctor KELLERMAN. And the inspector goes out with them and he very probably does his share of the work of digging those bushes.

Mr. BUCHANAN. He could do a good deal more by supervising them than sticking a grubbing pole in his hand.

Doctor KELLERMAN. Except just showing the men how to do it.

Mr. BUCHANAN. Yes; so that if you had an organization you could do an immense amount of work in one year, with the cooperation of the farmers?

Doctor KELLERMAN. I think that we have pretty generally that cooperation. There may be some areas where that is not the case. but if so we have not had them brought very sharply to our attention. So far as I am aware, we have had during the past year enthusiastic cooperation from individuals as well as from the State representatives.

Mr. BUCHANAN. Well, getting back now to my original question. I know nothing about the eradication of the barberry bushes. I am in favor of these appropriations that can be economically expended, that will be for the benefit of the nation and the protection of the nation. I am on this committee and when I am called on to vote for an appropriation, I want to vote for that amount of money that the Agricultural Department during the fiscal year can efficiently expend with economical results to the wheat industry. How much is it?

Doctor KELLERMAN. Until we could tell more definitely how much money we are going to get from the States, it would be hard to say, or state what our limits is. We can expend much more than we are expending now economically. That I can be sure of. Whether it is the best thing from other standpoints for us to spend that much on this campaign is an entirely different matter. We can do a certain amount of work with the money that is estimated for here.

DESTRUCTION OF WHEAT BY BLACK STEM RUST.

Mr. ANDERSON. What has been the maximum destruction of wheat, estimated destruction of wheat from black stem rust?

Doctor KELLERMAN. About 200,000,000 bushels in one year is the estimate.

Mr. ANDERSON. Do you know of any place where you can kill off any more, or where we can save any more money than that, economically?

Doctor KELLERMAN. I think that if we can prevent that kind of an epidemic, that it is the best that we can do almost any place.

Mr. BUCHANAN. There was another year when we come very near equaling that.

Doctor KELLERMAN. Yes, sir.

Mr. BUCHANAN. Another year when the loss was nearly 200,000,000 bushels.

Doctor KELLERMAN. There were two years when the loss was nearly that great.

STATE AID IN ERADICATION WORK.

Mr. ANDERSON. Can anybody tell us what the State legislatures will do? My understanding is that it is the expectation that the 13 States—that their appropriations will possibly be about \$150,000, which would probably be the maximum.

Doctor KELLERMAN. Yes; and that as a supplement to the appropriation that we have this year would not represent any more than an increase in the funds that could well be put into this kind of activity.

Mr. BUCHANAN. Why do you want to decrease these estimates?

Doctor KELLERMAN. I regret to answer that we didn't.

Mr. BUCHANAN. The Budget?

Doctor KELLERMAN. Well, our recommendation, Mr. Buchanan, was for the sum we had this year. That was the sum we believed we should continue to expend.

Mr. BUCHANAN. \$582,000?

Mr. ANDERSON. Do you feel that that sum would be adequate with what you would probably obtain from the States?

Doctor KELLERMAN. We think that that would represent a good campaign, perhaps as efficient as we could hope to make it in this one year.

Mr. ANDERSON. I understood that there was to be a conference in Minneapolis on the 9th and 10th of November on this subject.

Doctor KELLERMAN. Monday and Tuesday of this week.

Mr. ANDERSON. Was that held?

Doctor KELLERMAN. They held it and it was a very enthusiastic conference.

Mr. ANDERSON. Did you have any representatives there?

Doctor KELLERMAN. Yes; we had three men there and both Doctor Taylor and I hoped to get to that meeting.

Mr. ANDERSON. So did I.

Doctor KELLERMAN. But there were too many things going on in Washington this week, which made it impossible for us to go.

That meeting was a very enthusiastic meeting in every way. The Farm Bureau representatives, State representatives, and representatives of the grain trade, as well as people that have been directly concerned in carrying on this eradication campaign, have indorsed the campaign to the utmost.

The representatives from the different States, including the Farm Bureau people, have pledged themselves to do everything in their power to bring about liberal State support. And the entire conference, I learned just a few moments ago, unofficially, is urging more general Federal and State support for the whole campaign.

Doctor TAYLOR. There is every indication, Mr. Chairman, of widespread agreement in the importance of the work. The various persons and organizations interested hope to reduce the probability of another 150,000,000 or 200,000,000 bushel epidemic through prompt carrying through of this eradicating campaign.

Mr. ANDERSON. I have always been rather conservative in rapidly expanding programs of this kind. I was a year ago on this one, but I feel that if this is ever going to be expanded further it ought to be done this year. We are in a better position to expand now and get through with it than we ever have been or probably ever will be again, while I appreciate the need of economy.

Mr. BUCHANAN. Sometimes economy can be penny wise and pound foolish.

Doctor KELLERMAN. I would like to read one other paragraph from the statement of Doctor Stakman with regard to eradication of barberry bushes in Denmark and Sweden. [Reading:]

Barberry bushes have been almost completely removed from Denmark, and there has not been a single serious outbreak of rust since 1903, when most of the bushes were removed. The sporadic outbreaks now can easily be traced to barberry bushes which still remain in wooded and waste lands. Nothing could be more convincing than the contrast between the rust situation in Denmark and that in Sweden. In Denmark the rust does no damage whatever. In Sweden, on the other hand, it is extremely destructive because of the tremendous number of barberry bushes.

The reports of losses in Sweden are very much like the reports from year to year that occur in our own spring wheat region.

Mr. ANDERSON. Now, will you just briefly tell us how this work was organized this year?

Doctor KELLERMAN. The work is more definitely correlated with the county agents and with the farm bureaus than heretofore. It

has more nearly reached the stage of a general educational campaign or an extension campaign, and has largely left the field of experimental development. We are, therefore, working and just as far as possible utilizing the strength of the county agent organization. The work is centered in a State leader, and that State leader is furnished with as many special scouts as the funds available will permit.

These men are assigned to different areas to work over as special supervisors and to cooperate and enlist the aid of the county agents in trying to develop supplementary information and supplementary methods of spreading information. Posters, cartoons, circulars, and motion-picture films are all utilized in trying to get as widely spread as possible the information as to just what these men are supposed to do, by explaining to people what they are doing, so that their work can be devoted to scouting work, and explaining the best way of hunting for barberry bushes, showing people where they are likely to be concealed, what kind of a country they can expect to find them in, and what kind of methods are necessary to thoroughly kill them.

We are doing some experimental work in addition to that in the utilization of poisons instead of grubbing methods, in order to see whether there are ways of making eradication work more thorough and cheaper, but the bulk of it is in educational and scouting work.

Mr. ANDERSON. Do these scouts travel in pairs, or do they go alone?

Doctor KELLERMAN. I believe that they go alone in most cases, if not in all cases. They can cover more territory in that way.

Mr. ANDERSON. My information was last year that they were sent out in pairs. I never could see very much sense in a pair arrangement.

Mr. BUCHANAN. Company, company.

Mr. ANDERSON. Well, the way it was explained to me was that one went up and engaged the farmer in conversation at the front door while another fellow went around to the back door to see if there were any barberries around there any place.

Doctor TAYLOR. At times and in places it has been found practicable and economical to take several out in one machine and work a territory which was remote, returning together in the evening, so that in the morning outbound and in the evening home-bound there would be two or three or four—a flivver capacity load.

Mr. ANDERSON. Well, is this movement of these men, for instance, in a State, is it directed by State leaders, so that you have a local leadership there which is familiar with the local conditions and can deal with it from the standpoint of knowledge of the local conditions?

Doctor TAYLOR. Yes, sir.

Doctor KELLERMAN. We sometimes do not hear from these men except from month to month, but the State leaders have reports from the men from day to day.

Doctor TAYLOR. In connection with the experimental work that Doctor Kellerman mentioned, with reference to the investigational work that is being done in connection with the chemical control or eradication of the barberries, it should be understood that that is chiefly concerned with those sections where there has been a rather large escape of barberries to rocky, rough land where grubbing is almost impossible, and where it is clear that if you ever expect to kill out the barberries, you will need to do it otherwise than by

grubbing. Those areas are not large, but they are very difficult where there are rocky, rough places that are thickly set with barberry bushes. There are some such in Wisconsin, some in Minnesota, and some on rough river bank territory in Iowa. In certain of those places, organized bees, after the style of the farming country, have been enthusiastically prosecuted by the communities. By the use of certain arsenical poisons and common salt, in heavy applications, the eradication appears to be more thorough than in any other way.

CEREAL DISEASE-CONTROL WORK.

Mr. ANDERSON. The next item is the item on page 102.

Doctor TAYLOR. The item on page 102 is that for cereal disease control, one which it is proposed to eliminate by transferring funds to these other places that have been mentioned.

The next is on page 104, for the breeding and physiological study of alkali-resistant and drought-resistant crops.

TOBACCO INVESTIGATIONS.

Mr. BUCHANAN. How about this tobacco item on page 102? Is that all the same?

Doctor TAYLOR. I beg your pardon. The tobacco item on page 102 contemplates continuance of the work as it is. It is proceeding effectively.

FOR THE BREEDING AND PHYSIOLOGICAL STUDY OF ALKALI-RESISTANT AND DROUGHT-RESISTANT CROPS.

The next item is on page 104, for the breeding and physiological study of alkali-resistant and drought-resistant crops. There is no change proposed in that item. That work is proceeding as heretofore. The same remark would apply to subappropriation for sugar plant investigations on page 105.

SUGAR-PLANT INVESTIGATIONS.

Mr. ANDERSON. May I ask you in connection with the sugar-plant item if you have observed any extension of the sugar-beet area in the country within the last year or two?

Doctor TAYLOR. There has been material reduction of acreage of sugar beets grown in the vicinities of the sugar factories in most parts of the country as a result of the unsatisfactory outcome of the crops of 1920 and 1921, and the deflation of price which came to a head in the contract price for sugar beets in the season of 1922, which, of course, was determined last winter, when the sugar market was at its lowest and the sugar factories were experiencing very heavy losses due to the war rate contracts for beets which they were carrying and the low selling price of sugar which they confronted. There was dissatisfaction among beet growers which took the form of reduced contract acreages so that the acreage for this year in comparison to that for the preceding three years, I would say, without having the exact figures in mind, is materially less. However, there is continuing interest in territory not yet equipped with beet-sugar factories in

the possibility of developing sugar-beet production on a scale which would justify factory erection. That is true in portions of New Mexico. We have a recent inquiry regarding an area there and it is true in a number of sections where grain crops have not paid and where a more intensive crop is attractive to the farmers as a possible stabilizing feature of their farming.

In the irrigated regions generally, where there is not nematode infection or curly-top disease, the interest, I should say, is well sustained, with indication of a rather steady enlargement of the beet-growing area of the country.

FOR INVESTIGATION, ETC., OF WILD PLANTS, GRAZING LANDS, ETC.

On page 107, the subappropriation, "For investigation, improvement, and utilization of wild plants and grazing lands, and for determining the disposition of weeds and means of their control," the estimate provides an increase of \$3,600 needed for weed-control investigational work. The weed problem, especially in the wheat-growing territory, where the weed content of the threshed crop is an important feature in determining the grade of the grain, needs more thorough and persistent work in the investigation of the life history of some of the weeds that are troublesome and causes penalizations of the farmer in the grading of his grain.

Garlic is one of those. In the whole question of garlicky wheat, which results inevitably in the penalization of the grower beyond the economic or financial damage that occurs, there is needed fuller information than we yet have as to the best methods of controlling garlic in the regions where it is established. The same applies for a very different reason to the spring-wheat territory with respect to the so-called wild pea. It is a vetch—a wild vetch that lowers the grade. It is difficult of separation from the grain.

Mr. BUCHANAN. It necessarily reduces the yield?

Doctor TAYLOR. It reduces the yield somewhat. Also it is difficult to clean out for milling, as well as from seed grain.

Mr. ANDERSON. As a general thing the presence of these weeds in the wheat, for example, is it or not the result of seed that is not cleaned or is it a continual volunteering of the seed?

Doctor TAYLOR. It sometimes is the result of continual growing of that particular crop on a given field without the rotation of a cleaning tilled crop, like corn, or more intensive farming, and while we advocate more intensive cultivation and tilled crops in the interest of good farming generally and in the interest of weed elimination, we can not overlook the fact that under some conditions the farmer just can not carry a large acreage of corn or of any other tilled crop. He is practically forced to grow a large proportion of his acreage in sowed grains with the labor that he has and the market that he has. So it is important to locate the weak spots in the life history of the relatively few troublesome weeds if that can be done, to develop methods of controlling them measurably in general grain-growing practice. That seems to be all that the farmer can do under the existing circumstances.

Mr. ANDERSON. To what extent can the situation be corrected by growing barley, or rye, or crops that mature earlier?

Doctor TAYLOR. There is a possibility there in case of certain of the weeds that do not mature as early as these grains do. In case of garlic, it is becoming very troublesome in the Middle West, in Missouri and Kansas. The St. Louis market during the last two or three years has been full of garlicky wheat, as well as this old garlicky country of Maryland, Delaware, and tidewater Virginia. The practical control has got to come through deep ploughing in the fall and the planting of tilled crops with practically clean cultivation for at least one year. The deep ploughing results in a freezing and cleaning out of a large proportion of the bulbs, the clean tilling killing the remainder; the keeping of the fence rows clean as well as the fields is important, so that there will not be a reseeding of the field quickly from the fence rows.

Mr. ANDERSON. How much is the wheat penalized because of garlic?

Doctor TAYLOR. It is rather difficult to get at that, but there have been cases where studies have been made on a fairly large scale where the actual penalization that the farmer has carried has been anywhere from 10 to 15 cents a bushel. There was an estimate recently made based on a careful study of the inspection of the ports of Philadelphia, Boston, and Baltimore, where most of the wheat is exported—the Pennsylvania-grown wheat—and it showed that the farmers in Pennsylvania had been penalized during the year in question something like a million dollars merely on account of garlic, and Pennsylvania is not an important wheat-exporting State.

Mr. ANDERSON. Of course, the penalization would probably be relatively greater in the smaller markets than it would be in the larger ones?

DRY-LAND AGRICULTURAL INVESTIGATIONS.

Doctor TAYLOR. Yes. On page 108 is the appropriation for dry-land agricultural investigations. The estimates provide an increase of \$11,000, and the addition of a proviso removing this paragraph from the limitations in this act as to the cost of farm buildings. The reason for the increased appropriation is to make possible the replacing of implements and equipment and the repair of buildings on the field stations that are carried under this subappropriation. Of these, 2 have been in operation for 15 years; 2 for 11 years; 2 for 9 years; 1 each for 8, 7, and 6 years, respectively, and during the period (substantially the period since 1914) there has been necessarily a postponement of repair and replacements that we now have to make. Buildings need painting. Implements have been used to the limit of their efficiency, and the estimate is to cover that feature.

Mr. ANDERSON. How extensive are the buildings maintained on these dry-land stations?

Doctor TAYLOR. They vary greatly from distinctly important and permanent types of structure at Mandan, N. Dak., where the experiment station was specifically provided for by Congress several years ago, to a typical building outfit at such a field station as would consist of a dwelling for the superintendent, a barn, a tool house—in some places a threshing building for the handling of numerous experimental lots of grain—five or six frame buildings, which would represent an investment of probably ten or twelve thousand dollars.

Mr. BUCHANAN. These stations are engaged in experimental farming, are they not?

Doctor TAYLOR. Yes. In the Great Plains region, from the Canadian border down to middle western Texas.

VALUABLE RESULTS OBTAINED FROM DRY-LAND FARMING.

Mr. ANDERSON. Are we getting anywhere with this dry-land farming proposition?

Doctor TAYLOR. We are getting valuable results through this work, and I say that advisedly, because this work is the spinal column which largely sustains all of the experimental work of the dry-farming regions. The State institutions are cooperating with us, supplementing this work with independent stations in certain cases. We are getting a basis of facts which is going to be exceedingly helpful in the orientation of the agriculture of the future in that territory. The sad thing is that we could not have had this work done before a good deal of that country was opened and its farming begun, as it was, upon an exploitative basis in the earlier years.

Mr. ANDERSON. What relation will this dry-land experimental work have to livestock raising and forage?

Doctor TAYLOR. Exactly this—the development of a permanent live-stock industry there requires a fairly constant supply of planted forage as well as adequate grazing land and it is going to require probably the provision of forage for the equivalent of a winter 18 months long—a part of it hot.

In other words, the nonproductive seasons in which practically no planted crops make a yield. The question as to the acreage unit that a farmer can hope to support his family on, the types of crops that he can afford to grow, the methods of tillage that will insure supplies of forage and grain, all have to be calculated from the data obtained by experimentation at these stations. The determination of the frequency of these 18 months' long periods of light productions are through these records. They are the places where, because of the continuous maintenance of the work, the facts can be recorded and made available. Then, too, the prevention of irrational exploitation of these lands has got to come through the availability of information of this character to the public.

Mr. ANDERSON. It seems to me the production of grain crops in this section where you have periodic failures and long distances from markets and great disadvantages in freight rates is almost hopeless unless you can develop a live-stock industry which will reduce the cost of getting to the market.

Doctor TAYLOR. The shape in which it has crystallized in some of our minds is about like this: That the farming of considerable areas where almost sole reliance has been placed on grain for sale will have to be readjusted to the basis of a live-stock industry based primarily upon grazing on operating units big enough to maintain a farm family. This necessitates production of sufficient supplies of forage to carry the stock through the winter and to provide a carry-over of either dry or ensiled forage for the bad years. Grain production is a semispeculative possibility, the grain crop to be put in when the spring prospects look right for making a good crop, but grain for sale not to be relied on for the support of the family. The grain

crops will probably need to be regarded as an occasional source of cash income supplemental to this basic live-stock operation rather than as the basic feature of the farming.

Mr. BUCHANAN. Stock raising country with farming as an incident?

Doctor TAYLOR. Yes.

LIMITATION AS TO COST OF FARM BUILDINGS.

Mr. ANDERSON. I notice this proviso says that the limitation in this act as to the cost of farm buildings shall not apply to this paragraph. Is that limitation carried in the appropriation bill or in the law?

Doctor TAYLOR. It is in this bill and it is a limitation of expense of any farm building erected under the Bureau of Plant Industry to a maximum of \$1,500. A considerable number of these buildings on these field stations have cost more than that and would cost considerably more than that to replace in event of storm or fire destruction. As it stands we would be helpless until Congress authorized the expenditure in case we have a fire or destruction by wind storm there.

Mr. ANDERSON. What would be the maximum cost of buildings to be constructed there?

Doctor TAYLOR. Probably under present costs \$3,500 to \$4,500 would cover all but three or four. I could not answer that more specifically than that.

WESTERN IRRIGATION AGRICULTURE.

Page 110, subappropriation for investigations in connection with western irrigation agriculture, the utilization of lands reclaimed under the reclamation act, and other areas in the arid and semiarid regions, covers the corresponding experiment work on Government reclamation projects.

Mr. ANDERSON. How many have you?

Doctor TAYLOR. I think it is seven, including the field station at San Antonio, Tex., which is not on the Government reclamation project, but is devoted to irrigation practices of similar character.

NUT CULTURE INVESTIGATIONS.

Page 112 is the subappropriation for the investigation, improvement, encouragement, and examination of the adaptability of various species of nuts, etc. The increase over the amount carried by the regular appropriation bill of last year is \$10,000, the regular appropriation of \$20,000 having been supplemented by \$5,000 provided in the deficiency appropriation bill of June 30, to provide for a field station in the southern pecan territory, the maintenance of which, together with the other work, will require a net increase of \$5,000 for next year over the total that is available for this year.

PECAN INDUSTRY.

The increase is needed primarily for work on the pecan problem in the South and the walnut and almond work in the Pacific Coast States—California, Oregon, and Washington. It represents a modest

provision for this infant type of orcharding, which is assuming considerable importance and promises to be of still more importance in our future food supply. The pecan in some sections of the country already has become a dominant orchard crop. That is specifically true in southern Georgia and northern Florida. There is every reason to expect that it will become of larger importance in Louisiana and Texas where heretofore the wild production has been so great that the interest in the planting of commercial—

Mr. BUCHANAN (interposing). We already know the soil is adapted to them. We see the trees there.

Doctor TAYLOR. Yes. The biggest pecan trees I have seen at all are, I think, in the Trinity Valley, up near Hedley, Tex. But one of the practical things of importance is the determination of the adaptability of the particular improved varieties to special soil types. There are some marked differences in the behavior of such varieties, such as the Schley, which is highly desirable after you get it, bears well, brings good prices, etc. It needs the same sort of study as the apple, peach, pear—in fact, all the tree fruits have required before they are shaken down into their permanent production territory. It is one of the distinctly important infant orchard features of our agriculture.

Mr. BUCHANAN. I think so too, and I think we know that the land is adapted to it. I know so in my section.

Doctor TAYLOR. Of course, you have there in your section the natural pecan production to guide you. The surprising thing is that the commercial pecan orchard in its most intensive form has developed outside of its natural territory—

Mr. BUCHANAN (interposing). Do you know why it is? It is because it takes pecans too long to develop into something profitable.

Doctor TAYLOR. Yes, sir; and that is why, in the Southeast, if they wanted pecans, they had to go to work and raise them. They could not go to the woods and get them.

FOR INVESTIGATION AND IMPROVEMENT OF FRUIT AND METHODS OF FRUIT GROWING.

On page 113, the subappropriation for investigation and improvement of fruit and methods of fruit growing, there is an actual increase of \$15,000. This is required for the provision of fences, buildings, equipment for the operation of the two experimental vineyards which Congress authorized the purchase of last year, and which are now government property, but have to be operated by the department directly instead of indirectly through cooperating owners of the land. These are at Fresno and Oakville, Calif. One is in the hot San Joaquin Valley, the raisin territory, and the other in the cooler bay region.

Mr. ANDERSON. They seem to be getting along very well with their price without much help.

Doctor TAYLOR. They have through the unexpected developments following the constitutional amendment, up to this year, but they have had very severe losses this year through failure of the transportation systems to move the fresh grapes to the Eastern consumers. This work was begun back in the days when wine and brandy were the principal objectives of the growers of a large proportion of the acreage of grapes.

Mr. ANDERSON. This increase, I understand, is to cover additional equipment, fencing and so on, but does not enlarge the experimental station.

Doctor TAYLOR. No; it does not enlarge the area at all. These vineyards were established as cooperative vineyards, the labor upon which, the team power, and the buildings used for which, were secured by the department from the growers through reimbursement of the actual operating expense of labor, material, etc., to the owners of the land.

Congress decided to purchase the vineyards when the apprehended catastrophe loomed up and authorized their purchase. These are now Government-owned property without fencing or buildings and without operating equipment. This year they have been carried along under a makeshift arrangement with the neighbors, which it is not practical to continue.

Mr. ANDERSON. There are no buildings on these properties?

Doctor TAYLOR. No, sir.

Mr. ANDERSON. And no fences?

Doctor TAYLOR. I believe there is an outside fence along the Fresno property.

Mr. ANDERSON. What buildings will it be necessary to erect there?

Doctor TAYLOR. It will be necessary to erect a general workshop and field laboratory building at each, and it will be very desirable to provide a dwelling for the man in charge as there is no housing nearby in either place for such a man, and he should be there on the place at all hours of the day.

Mr. ANDERSON. How many people do you have on these places?

Doctor TAYLOR. We have not anyone at present steadily there except near-by laborers working under supervision of an assistant in California who has general supervision over them. At certain times of the year, at the propagating times, and again at harvesting time, when the fruit is harvested for the testing, there are two or three temporary employees maintained.

Mr. ANDERSON. You have no permanent man on either one of these places?

Doctor TAYLOR. No; we have no housing whatever on either place, either for men or for implements.

Mr. ANDERSON. Do you have anybody who goes out there more than once or twice a year?

Doctor TAYLOR. Oh, yes; we have the near-by laborers, who are there nearly every day, under the direction of the technical assistant in general charge of the vineyards.

Mr. ANDERSON. But you have no superintendent?

Doctor TAYLOR. No superintendent there; no, sir.

Mr. BUCHANAN. How many acres have you?

Doctor TAYLOR. Twenty acres at each place.

Mr. BUCHANAN. Planted in grapes?

Doctor TAYLOR. Yes, sir.

Mr. BUCHANAN. All in grapes?

Doctor TAYLOR. Yes, sir.

Mr. BUCHANAN. Is there any plowing and cultivation of it?

Doctor TAYLOR. Yes. That thus far done during the transition period since the vineyards were purchased last winter has been by hiring arrangements with near-by vineyardists.

Mr. BUCHANAN. What is the reason for continued ownership of this by the Government and operation of it by the department? There is nothing but 40 acres of grapes out there.

Doctor TAYLOR. These two 20-acre vineyards which are about 150 miles apart and in different climatic regions of California, contain at the present time, without doubt, the most comprehensive collection of varieties of the Old World type of grapes that exists in the world. They involve not merely the testing of those varieties as an ordinary orchardist or vineyardist does, but the determination of the phloxillera resistance of the stocks on which the varieties are grafted and the congeniality of those varieties to these resistant stocks.

Mr. BUCHANAN. Then, in short, this stock is determining the adaptability of the varieties to this country and climate, and conditions under which those varieties can be grafted?

Doctor TAYLOR. Yes, sir; and the conditions under which the varieties can be grown on resistant stocks.

Mr. BUCHANAN. How long will it take to determine that?

Doctor TAYLOR. Probably 20 years.

EXPERIMENTAL GARDENS AND GROUNDS, WASHINGTON, D. C.

On page 115 is the paragraph for the maintenance of the grounds here in Washington. There is no change.

FOR HORTICULTURAL INVESTIGATION.

On page 117 the subappropriation for horticultural investigations, which includes also the technical studies of the physiological changes of vegetables while in the processes of marketing and storage, carries an estimate of \$1,500, which relates specifically to investigation of vegetable transportation work. The questions of primary importance may be said to be those involved in transportation of northern potatoes, the whole question of production of potatoes against harmful temperatures in transit in winter—harmful both through freezing, through the effect of cold in unheated cars, and the determination of the relation of the heated-car temperature to the carrying quality of the product where heater-car service is not maintained.

This is needed especially with reference to the northern Maine, Minnesota, and Dakota potato-growing districts, and the potato producers and shippers have——

Mr. ANDERSON (interposing). We would not worry much now, anyhow, as to how they behave in refrigerator cars or other kinds of cars if we could get the cars. We will take a chance on how they behave.

Doctor TAYLOR. Yes; until it gets down to about 25° or 30° below zero, then sometimes there come very heavy losses on account of freezing in transit when with the transportation charges already lying against the shipment. Unfortunately these destructive freezes do not always occur in years when potatoes are cheap.

Mr. ANDERSON. I notice in this item on page 113 that there is a provision for the investigation of these physiological and related changes of fruits and vegetables during the process of harvesting and while in commercial storage, and in the same general item appears this item on page 115. What is the difference?

Doctor TAYLOR. The difference is that the item on page 117 is the work done on fruit, the word "vegetable" being inserted there to make it technically legal to carry work on both products where necessary and advisable, and to simplify the financing of it. Primarily that on page 113 deals with fruit studies and primarily that one on page 117 deals with vegetables. Generally the products under experiment are from different sections of the country at any one time, though not always.

NURSERY STOCK INVESTIGATIONS.

Page 119 contains the item for investigating and cooperating in connection with State or privately owned nurseries, methods of propagating fruit trees, ornamental and other plants, the study of stocks used in propagating such plants and methods of growing stocks, for the purpose of providing American sources of stocks, cuttings, or other propagating material. This is a paragraph under which our experimental work looking toward the development of larger production of grafting stocks of fruit trees and ornamental plants in this country is being done to reduce our dependence upon imported stocks of this character from foreign countries. Such importations always, in spite of any guaranties or inspections that can be maintained, involve a certain risk of introduction of additional pests, and in proportion to the completeness of our production of our own requirements in this country are we likely to exclude such destructive pests.

Mr. ANDERSON. To what extent is progress being made on the production of seedlings used in this country?

Doctor TAYLOR. Considerable, both as to seed-grown stocks and vegetatively propagated stocks. The progress made gives promise of perhaps ultimately displacing seedling stocks for some kinds of fruit trees. For instance, in the case of the apple, through propagation of grafting stocks of special varieties from cuttings, so that in place of a variable lot of seedling apple stocks to graft upon you may have uniformly vigorous, hardy, and insect-resistant stocks. Very distinct progress has been made within the past two years in that direction, particularly in case of the apple. Some of that work was done out here at Bell Station in Maryland, and some of it in Michigan. It is a field in which our men are pioneering in the expectation that some of the problems will be simplified—some of the problems of the nurserymen and the production considerably stabilized.

Mr. BUCHANAN. Does the grafted or budded tree take on the hardihood of the tree from which it came or the tree on which it was budded or grafted? It produces the variety of the tree from which it was taken, but how about the hardihood, and resistance?

Doctor TAYLOR. That is a very complicated question. In some cases, grafting on certain stocks increases the hardiness of the variety that you are propagating. As for example, the Satsuma orange when grafted on the trifoliate stock, which is what is called the hardy orange, which sheds its leaves in the winter and is distinctly hardy, will endure lower temperature than if grafted on the sweet oranges, which is the standard stock of the more southern citrus districts.

Mr. BUCHANAN. Will it endure the same degree of winter as the other?

Doctor TAYLOR. No; the ungrafted trifoliate stock trees are hardy here in Washington. What appears to account for the greater cold endurance of citrus trees grafted on this stock is the fact that the trifoliate stock becomes dominant in the fall at the time when it normally sheds its leaves and remains dormant until spring, while the sweet orange stock keeps on growing, so the Satsuma orange graft on the sweet orange stock is in a state of vegetative growth much later in the fall than it is on the other.

ARLINGTON FARM AND AGRICULTURAL STATION.

On page 121 is the subappropriation under which Arlington Farm is maintained as an agricultural experiment station. Here Congress provided, as you recall, last year for a heating plant, \$50,000. This is now well toward completion in construction.

The amount carried by the Budget is \$20,500. In our original estimate we asked for the retention of \$9,500 of the building fund appropriation to meet increased expenses of maintenance and operation, including the provision of a fence about Arlington Farm to protect it from invasion and improper use.

Mr. JUMP. Is that not a matter which we should really take up with the Budget Bureau?

Doctor TAYLOR. That amount is needed if we are adequately to protect Arlington Farm as we think we should from encroachments at night for purposes illegal and destructive.

Mr. BUCHANAN. Well, you have been getting along for a long time without this, have you?

Doctor TAYLOR. We have.

Mr. ANDERSON. Will it take \$9,500 to put a fence around there?

Doctor TAYLOR. Our best estimate is that unless we can force or induce the railroad to fence its right of way across the property it will cost approximately \$10,000 or \$12,000 to fence the farm as it should be. The solicitor has investigated the title to that railroad property and we have been advised that we can not force them to fence their right of way. There is a greatly increased value of Government property on the farm now, in comparison with earlier years, and greatly increased risk, due to changed conditions.

FOR FOREIGN SEED AND PLANT INTRODUCTION.

Page 123, the subappropriation "for investigations in foreign seed and plant introduction, including the study, collection, purchase, testing, propagation, and distribution of rare and valuable seeds, bulbs, trees, shrubs, vines, settings, and plants from foreign countries and from our possessions," etc., there is no change in that item.

PURCHASE, DISTRIBUTION, ETC., OF NEW AND RARE SEEDS.

On page 125, the subappropriation which covers the forage crop investigational work and the distribution of new and rare field seeds, there is a reduction of \$20,000 in the proviso which finances the field seed distribution, and at the same time there is a proposed increase of the amount available for the experimentation in clover work of \$5,000, so that the estimate involves a net reduction of \$15,000 in the amount carried by the paragraph. That reduction is made in recognition of the urgent need of economy of expenditure.

Mr. ANDERSON. You are going to economize here at the expense of we Congressmen, are you?

Doctor TAYLOR. We feel that we suffer equally in this case, even with the Members. This work is accomplishing unquestioned and material benefit to agriculture.

Mr. ANDERSON. Well, it is a perfectly hopeless proposition to spend \$115,000 getting new and rare field seeds in here and \$20,000 getting them out where they will do some good. I think it is ridiculous. If this new and rare seed proposition is not any good, let us cut it out; but if it is some good, it ought to be good enough to get it out to the people where it will do some good. It does not do any good to import a lot of stuff down here into the department, or in parts of the country where it never gets off the grounds of the United States. It does not make any difference to me who does the distributing. I think it is ridiculous to spend a lot of money and get this stuff into the United States and never get it out of the department.

CONGRESSIONAL SEED DISTRIBUTION.

Doctor TAYLOR. On page 127 the subappropriation known as the congressional seed distribution is not recommended. The explanatory note is—

Mr. ANDERSON (interposing). Let me ask you one question about this item. In the event that the Congress, in its wisdom, should conclude that this was a desirable item to continue, would it require as much money next year to make the same distribution?

Doctor TAYLOR. I should have to get closer estimates on the prospective cost of seed than I have now. I should have to look into that.

Mr. ANDERSON. I wish you would give me an estimate of what it would cost on the basis of this year and approximately what that would mean in number of packages on the basis of the quotas this year?

Doctor TAYLOR. I do not think there would be a material difference unless there is some prospective difference in the cost of labor, paper, packets, and supplies required in connection with the distribution.

Assuming that the cost of seed in 1923 will be substantially the same as during the current year, it is estimated that a distribution of 13,000,000 packages (substantially the same as that of the present year) could be made for \$360,000. This assumes that the packaging, assembling, and mailing of the seed could be contracted for at substantially the present rate of \$1.988 per thousand packages.

This would provide quotas of 20,000 packages of vegetable seeds and 2,000 packages of flower seeds to Senators and Representatives. Should the cost of seed and paper be slightly lower than at present, these quotas could be provided with an appropriation of \$350,000.

With an appropriation of \$239,416 (as in the fiscal year 1921), the necessary overhead cost of the packaging, assembling, and mailing being substantially the same as for the larger distribution, a total distribution of 8,500,000 packages could be made. This would provide quotas of 13,000 packages of vegetable seed and 1,000 packages of flower seed for each Senator and Representative.

FOR BIOPHYSICAL INVESTIGATION.

On page 130, the item for "Biophysical investigation" is not changed.

Mr. BUCHANAN. What is that? What is biophysical investigation?

Doctor TAYLOR. This has rather to do with the physics of life.

Mr. BUCHANAN. Of plant life?

Doctor TAYLOR. Yes, sir. The physical features of plant growth in contradistinction from the chemical features.

Mr. BUCHANAN. I thought the chemical features determined the biological features of them?

Doctor TAYLOR. This has to do with such features as to water requirement, the transpiration and movement of the water supply of plants rather than to their chemical relationship. It is a coined word to cover a type of activity which to a considerable extent is centered around the devising of equipment for the actual measuring of the physiological processes through which plants grow, through which the water distribution is determined—plant growth and phenomena.

Mr. ANDERSON. This is distinctly a technical investigation?

Doctor TAYLOR. A technical investigation, and is of importance because of its relationship to several other lines of technical biological work.

TUESDAY, NOVEMBER 29 1922

INSECTS AFFECTING THE PECAN.

STATEMENT OF MR. J. M. PATTERSON, PUTNEY, GA.

Mr. ANDERSON. The committee will return this morning to the three items relating to the pecan, the first to diseases of the pecan, the second to insects affecting the pecan, and the third an item relating to improved methods in connection with the culture of the pecan.

We will first hear Mr. Patterson.

Mr. PATTERSON. Mr. Chairman, I am here representing the National Pecan Growers' Association, the Georgia-Florida Pecan Growers' Association, and the Paper Shell Pecan Growers' Association. I think that it was in May of this year that a committee representing these various associations came to Washington and had a conference in Secretary Wallace's office. We had suddenly been confronted with some diseases and some insect pests which looked very serious to the pecan industry. We came to Washington, and Secretary Wallace invited in Doctor Taylor, Doctor Quantance, Doctor Corbett, and Doctor Waite, and we had a rather lengthy conference, going over those matters in detail. Following that conference this committee submitted to Secretary Wallace provisions covering the matter and suggestions as to an increase in the appropriation, which we thought we could reasonably ask, in order to take care of these troubles.

The two chief troubles we had were scab and the pecan nut case borer, either one of which, if it continues to spread in the groves threatens the almost complete extinction of the industry. We

understand that Secretary Wallace recommended to the Budget Committee practically the amounts that we requested should be recommended, with, perhaps, one exception. In fact, we have a copy of a letter here that Secretary Wallace wrote to Congressman Grist giving an outline of what was recommended. We had asked that \$5,000 be added to the appropriation for the office of Soil Fertility, which the Secretary, evidently, did not see fit to approve. He recommended \$5,000 for the office of Entomology, which covers the insect situation, and \$5,000 additional to Doctor Corbett's office, and \$2,000 to the office of Plant Diseases. Now, we are here, gentlemen, just to impress upon you, if we may, very briefly, the importance of those items. We, perhaps, understand that there is little use in talking about the addition to the office of Soil Fertility, inasmuch as the Secretary did not see fit to recommend that in connection with pecan culture. That additional appropriation was not so essential to us. The office of Soil Fertility has been doing some splendid work in connection with the pecan groves, and they have been pointing out to us the way of fertilizing to the best advantage in connection with pecan culture. Therefore, we will not ask for any consideration of that matter,

The two things that are pressing for the pecan growers are plant diseases and insects. The fungus or scab at first attacked only one or two varieties of pecans, but in the last year or two it has attacked every variety in some localities. It has not attacked every variety in one locality, but when you make a survey of the pecan territory, so far as I know, there is not a single variety of pecans that has proven to be immune to the scab. In our section around Albany or Putney the Delmos variety was, it seemed to me at first, the susceptible variety to the scab, the scab practically eliminating the Delmos crop after three years. Doctor Waite's department has been experimenting with sprays, and has succeeded in getting some control of the scab. As I understand it, to put it briefly, the appropriation that was in effect last year was sufficient to support one investigator on the scab, and with a small addition to that appropriation of \$2,000 they would have funds enough to support two investigators, because they have the equipment that the two men could use, and by that small additional appropriation of \$2,000 added to the \$8,000 that they have now they could double the efficiency of the work of the department in that one line of investigation. The pecan nut case borer began its operations in the Monticello district some six or seven years ago. Doctor Quaintance's department did some experimental work there, and then the parasites came along and practically eliminated the case borer, and the work was discontinued. In order to make it clear, I will say that Monticello is about 60 miles south of where I am located, at Putney.

That is in Florida, and the pecan nut case borer did not get up into our district until this year. It seems that it travels somewhat like the boll weevil, and we were congratulating ourselves that it would confine itself to the southernmost border of Georgia and northern Florida. We thought that it was not going to spread further, but that pest came up into the Putney district this year. Our orchards that were farthest south suffered tremendously from that. To give you some idea of the damage, I will say that we have nut groves in our association from which we gathered last year between 40,000

and 50,000 pounds of nuts, but this year we will get from those groves not more than 1,500 pounds. It is only fair to say that the crop that the trees put on this year was not as large as it was a year ago, but the crop that the trees did put on was practically destroyed by the case borer. We are very anxious about the case borer, and Doctor Quaintance fully realizes the importance of it. It is to the pecan industry, I think, exactly what the boll weevil is to the cotton industry.

Mr. BUCHANAN. Does it attack the young nut?

Mr. PATTERSON. Yes, sir; it eats right into the young nut, and when it has eaten out one nut, it goes into another. It spreads from one cluster of nuts to another.

Mr. BUCHANAN. You are comparing that pest to the boll weevil. Do you know what you are putting us up against?

Mr. PATTERSON. I do not think it will be so hard to control as the boll weevil. I say that it is traveling like the boll weevil, and it is going after the fruit in its early stages like the boll weevil does. I do not believe it will take anything like the money or trouble that is required in the control of the boll weevil. It gets inside of the nut and it is hard to reach it with a spray.

Mr. BUCHANAN. The boll weevil punches a hole inside of the square. Does this insect bore a hole into the nut, or does it punch a hole?

Mr. PATTERSON. It eats right into the nut and goes inside.

Mr. BUCHANAN. Like the bollworm?

Mr. PATTERSON. Yes, sir; it eats right into it. He gets inside of one of them and the little ones crawl out and bore into others. That is about all I have to say. I wish simply to say to you gentlemen that here is a great industry with millions of dollars invested in it. This industry has been going along beautifully, with increasing revenues, and it has been very largely taking the place of cotton in certain sections of the South. Then we find the industry suddenly threatened in this way. We do not ask any great sum of money, and I do not believe that is necessary, but we do ask for sufficient funds to put sufficient investigators in the fields so that they can arrive at a conclusion as promptly as possible.

I have asked Doctor Taylor if he would come over here, and I see that he is present.

Mr. LEE. Can you give us some idea of the magnitude of the pecan industry in Georgia and the South?

Mr. PATTERSON. That is hard to tell, but I should say there are from 75,000 to 100,000 acres of cultivated pecans in Georgia.

Mr. LEE. How many trees would that be?

Mr. PATTERSON. There are about 20 trees to the acre. I personally have charge of some 6,000 acres, with 120,000 trees, and I can say to you gentlemen that last year from those groves of which I have charge we had a yield of something over 600,000 pounds of nuts, but this year we will hardly get 125,000 pounds, that being largely due to the scab.

Mr. BUCHANAN. Does the scab attack the leaf or the tree?

Mr. PATTERSON. It attacks the leaf and the nut. It just eats into it and stops the development of the nut.

Mr. BUCHANAN. It is altogether different from the other insects?

Mr. PATTERSON. This is a fungus. It is not an insect at all.

Mr. BUCHANAN. I suspect it is an insect, too.

Mr. PATTERSON. It may be a microscopic insect.

Mr. BUCHANAN. Doctor Taylor says it is not an insect, and I am willing to take his word for that.

Mr. PATTERSON. If there are no further questions, I do not want to take up any more of your time.

STATEMENT OF DR. WILLIAM A. TAYLOR, CHIEF, BUREAU OF PLANT INDUSTRY.

Doctor TAYLOR. I understood that my presence here was to be, in diplomatic language, merely that of an observer. As to this particular item not being included in the Budget, or the \$2,000 provision for this particular pecan scab, I will say that we have at present available for use \$82,000, of which \$8,000 is devoted to pecan diseases. That suffices, in addition to the amount for field expenses that are necessary for the employment of one pathologist continuously on that work, and of one or two temporarily during the growing season. We need one additional year-around man as an assistant, and it will cost practically \$2,000 to get him. Then we will be in shape to hit this problem hard, and we believe we will be able to secure results that are important considerably sooner than we could with our present funds. Mr. Patterson has correctly stated the urgency of the matter. One feature that may be worth mentioning is this, that in the control of this fungi which, necessarily, must be through spray applications, we have a very narrow margin of possible success. We must use a fungicide that is strong enough to kill the fungi and yet not strong enough to hurt the trees. There is a risk of defoliating the tree, with consequent harm to the crop. We want a fungicide that will answer the purpose under any climatic conditions. For that reason we will have to continue this work for several seasons in that same locality until we are sure of the formula and of the application schedule. It is a very meritorious proposition, and one that we will be very glad to administer if the funds are available.

STATEMENT OF HON. CHARLES R. CRISP, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA.

Mr. CRISP. Mr. Chairman, I had not intended to say anything on this subject. I am very much interested in this proposition, however, my district being largely engaged in the pecan industry. Judge Park's district, which adjoins mine, has older orchards. Our people are confronted with the necessity of learning to diversify, and many of them have begun to diversify by putting out large pecan orchards. I believe very much in the future of the pecan industry, and I believe that if you make the appropriations here proposed they will be instrumental in solving this trouble that has been described to you. I hope you will give this request careful and favorable consideration.

STATEMENT OF HON. FRANK PARK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA.

Mr. PARK. Mr. Chairman, the investors in these pecan groves are not all local people. A great many of them are from Detroit, who have bought up 5-acre tracts, and a number of them are from Chicago, Pittsburgh, and other like cities. There must be between seven and eight million dollars invested by these people. A good many

of the people who have made these investments are suffering almost for the necessities, and a good many of them, under the present conditions, do not get an income of nearly as much as they would be able to make in factories and things of that kind. To allow this industry to be wiped out for the lack of a few dollars looks like poor policy on the part of the Government. It is a rapidly growing industry, and nearly everybody wants to have pecan trees. I am going home to plant out 16 acres myself, and will do a good deal of the work myself. I believe in it. Undoubtedly it is the most nourishing and most valuable nut we have in this country.

STATEMENT OF MR. E. G. HESS, MANHEIM, PA.

Mr. Hess. I am president of the Keystone Pecan Co. and am a member of the Federal aid committee of the National Pecan Growers' Association.

Mr. Chairman, I conferred with a number of men in the Department of Agriculture just a week ago to-day, and I also saw the chairman of this committee. It is because of the great importance of giving the Department of Plant Diseases this \$2,000 that I appear here to-day. I presented this matter to Mr. Patterson, and that is why he is here to-day. It is because of the need of an additional scientific man in that department, and he is needed just as soon as he can be put on the job.

That is all I wish to say.

MONDAY, NOVEMBER 27, 1922.

INVESTIGATION AND IMPROVEMENT OF CEREALS.

STATEMENT OF MR. HARRISON FULLER, SECRETARY AND DIRECTOR OF THE CONFERENCE FOR THE PREVENTION OF GRAIN RUST, MINNEAPOLIS, MINN.

Mr. ANDERSON. We will return to the item on page 100, "For the investigation and improvement of cereals, including corn, and methods of cereal production," with a proviso that \$200,000 shall be set aside for the location and destruction of the barberry bushes and other vegetation from which rust spores originate.

Mr. Fuller, we will be glad if you will take charge of the hearing.

ERADICATION OF BARBERRY BUSH.

Mr. FULLER. Mr. Chairman, last spring, as you know, an organization called the Conference for the Prevention of Grain Rust was formed, representing the agricultural interests of 13 States, including the area from Michigan, Ohio, and Indiana, west to Montana, Colorado, and Wyoming. Representatives of that organization came to Washington, and as a result of the statements made by them, Congress appropriated \$350,000 for the eradication of the common barberry bush, the appropriation being increased from the former appropriation of \$147,200, which had been granted by Congress for each of the three preceding years. We come before you now to ask for an appropriation of \$500,000 for the next fiscal year.

As a basis for that request, you already have some knowledge of what was accomplished by the Department of Agriculture with the appropriation of \$350,000, and this committee will assume, unless otherwise instructed, that you are completely informed with regard to the manner in which that appropriation has actually been handled by the Department of Agriculture. In addition to that, of course, we want to present some general considerations about the accomplishments of the past season from the lay point of view and from the point of view of the farmers and grain growers themselves. In a general way, it can be said unqualifiedly and emphatically that by reason of the appropriation of \$350,000 the work of barberry bush eradication has been tremendously expedited, and that gains were made in attacking the problem that could not possibly have been made in three or four or five years of smaller expenditures. We are now in a position, by reason of the fact that the campaign has progressed so successfully, to see the end of the campaign, and that, I take it, is something in which Congress is very much interested. You have been making appropriations now since 1918. This year \$350,000 was expended, and that has brought the campaign to the point where we can say that it is very probable that in almost all of the States included in the barberry eradication area the necessity for any Federal assistance after two more years will have been eliminated; and that in many of the States, as some of the gentlemen present will show you, only one more year of Federal cooperation and Federal financial support will do the job.

During the past summer the organization of which I have spoken has been directing its efforts toward the dissemination of general information with regard to the barberry and the destruction to grain which it has caused. For that purpose we have put on a widespread publicity campaign, which has brought very tangible results. In order to give you a practical idea of what we have done, I will say that we have sent out altogether about 500,000 pieces of publicity, including informative literature and posters. These have been distributed to the county agents, railroad-station agents, lumber yards, creameries, mills, banks, elevators, and to many individuals and other institutions throughout our area of 13 States. A careful check shows that our posters are being well displayed, and that we are getting the message across to the people to whom it is directed. In addition to that, we have succeeded in obtaining about 2,500 columns of newspaper space. That, of course, is publicity which reaches the individuals direct, and it shows a desire upon the part of the newspapers to cooperate with the Federal and State Governments and with ourselves in this movement, which is exceedingly important. In addition to that we have provided a large number of exhibits showing exactly what the barberry bush is and the damage that it causes.

With our exhibits we have reached 108 county fairs, about 30 or 35 State fairs and sectional expositions, and such larger expositions as the Pageant of Progress at Chicago and the National Dairy Show at St. Paul. The result of our campaign is—and we are sincerely convinced of this fact—that there has been built up a widespread public sentiment, which, as you know, is the most effective weapon in a campaign of this kind. We have succeeded in building up this sentiment by reason of the fact that the Federal Government was

putting money into the campaign. We succeeded in building it up by telling exactly what the barberry bush has been doing to our grain crops, and we are very anxious to have the committee consider the desirability and financial expediency, if you please, of cashing in on that public sentiment. One manifestation of that public sentiment is of immediate and direct interest to your committee: We are prepared to say now that our assurance of obtaining appropriations from the States most interested in barberry eradication is very good. We have in practically all of those States already started barberry-eradication appropriations on their way. Governor Nestos and Mr. Kitchen, of North Dakota, are calling for a \$25,000 appropriation for that State. Minnesota, as you know, has had an appropriation of \$20,000 for the last two years, and that appropriation will be repeated and, possibly, increased.

The situation in South Dakota is not so definite beyond the fact that the Farm Bureau Federation in that State and the commissioner of agriculture are with us and are going to do everything they can to obtain an adequate State appropriation. In Illinois, the commissioner of agriculture tells me that he has already included in his estimates an item of \$20,000 for barberry eradication. In Wisconsin the commissioner of agriculture has included a similar item of \$15,000, and is going to increase it to \$25,000 if it can be increased before the legislature meets. In Michigan the plant pathologists have requested an appropriation of \$22,000. In Ohio the commissioner of agriculture tells us that he is going to put in a request for an appropriation of \$15,000. Therefore, you can see that as far as can be done at the present time, the States are preparing to make appropriations. We have admitted from the very start of this campaign, of course, that a large portion of it should be State responsibility, but we have not admitted, and do not now admit, that it is entirely a State responsibility by reason of the fact that it is essentially a regional problem. The States are now ready to assume their share of responsibility and will do so at their next legislative sessions. You realize, of course, that it would be futile for me to promise that the States are going to do thus and so. All that we can say at this time is that the commissioners of agriculture are including barberry eradication items in their budgets, and the farm bureaus are doing everything they can to obtain those appropriations.

Mr. ANDERSON. Do you know what State appropriations were available for this purpose this past year?

Mr. FULLER. For this year the only specific State appropriation for barberry eradication was that of Minnesota of \$20,000. However, the commissioner of agriculture of Ohio tells me that between three and five thousand dollars was spent in that State for barberry eradication out of funds available for that kind of work. The same thing is true in other States. By reason of the fact that the appropriations were not specifically for the purpose of barberry eradication, it is very difficult to make a precise answer to that question. We know that in Wisconsin several thousand dollars were spent by the department of agriculture in cooperation with the Federal Government. All of the items for next year about which I have been speaking, however, are to be specific appropriations for barberry eradication. As you understand, the State legislatures do not meet until after the 1st of January, and some of

them do not adjourn until almost the 1st of April, so that the actual appropriations made by the State legislatures will necessarily be an uncertain quantity until the State legislatures actually adjourn. You are as familiar with that problem as I am, but we want to emphasize the fact that the States are ready to go forward, and the support is well organized in every State.

The other members of our committee here to-day includes the presidents of three State farm bureau federations, and two plant pathologists. All of them have interesting statements to make and, if it is agreeable to the chairman, I will ask Mr. Reed, the president of the Minnesota Farm Bureau Federation, to make a statement.

MONDAY, NOVEMBER 27, 1922.

ERADICATION OF BARBERRY BUSH.

**STATEMENT OF MR. J. F. REED, PRESIDENT MINNESOTA
BUREAU FARM FEDERATION, ST. PAUL, MINN.**

Mr. REED. Mr. Chairman and gentlemen of the committee, Minnesota has rather taken the lead in this matter. That was probably because of the fact that it is a large spring-wheat growing area and has seen the damaging results of the ravages of the black stem rust more than some other areas. We have seen the rapid falling off in the amount of grain produced in the State and the hazard to which the farmers were subjected. That probably had much to do with the State of Minnesota two years ago appropriating \$40,000, to be used last year and this year in this work. With that appropriation and with what the Federal Government has provided we have made very substantial progress. There has been a very lively interest in the problem, not only on the part of the farmers but on the part of grain dealers, millers, and others who are directly interested in the matter. However, the general public or the consuming public of the State was never apparently aroused to the actual necessities of this matter until 1921.

Much of that interest was brought about through the establishment of the Conference for the Prevention of Grain Rust, and, also, because of the scientific explanations given by the pathologists of the Department of Agriculture and by the pathologists in our own school of agriculture. Through those means the idea has gotten pretty well known to the people of Minnesota and to all of our people, not only to those engaged in the raising of grain or the handling of it, or the manufacture of it, but to the consuming public as well, that this is a very potent cause of a very large loss that comes annually to our grain production. With that knowledge, a very active campaign has been carried on for the eradication of this bush. In 1918 the section of Minnesota in which I live, or the southeastern part of the State, was surveyed by officers from the Department of Agriculture, and those bushes were removed, or the original plantings. There has been a very hearty cooperation on the part of the farmers in this country, and wherever these bushes exist or are known to

exist, the farmers are very anxious to cooperate in their own way and to do everything they can to remove them.

There has been, and is yet to a limited extent, I believe, ignorance on the part of some of our people as to the identification of this bush, but much of that has been removed during the past summer by the advertisements and publicity that have been given in the manner stated by Mr. Fuller. There is a very hearty cooperation on the part of the farmers in the neighborhood, on the individual farms, and on vacant lots and other places where those bushes have escaped. The Minnesota Farm Bureau Federation, having unit organizations in 80 counties, has made arrangements through its town units to have these bushes exhibited, or samples of them exhibited, and to urge their eradication. Seventy-three counties have been surveyed in the State now. That has been done during the past five years through the appropriations from the Federal Government and appropriations from the State, and there has been some research work done. We think that by the end of the coming year, with such an appropriation as we are asking for and such as I think could be economically expended, the State will have been gone over once, and probably all the old plantings will have been removed.

No doubt there are some escaped bushes, and there are sprouts from bushes that have been removed, and it might be necessary to go over them again. We have in our State a State weed inspector, and the counties have weed inspectors. It is a part of their duty to see that these bushes are taken out. Some of them work under the commissioner of agriculture of the State, and they are given specific instructions to see that those bushes are removed; that is, either to remove them themselves, or to see that the owners of the places where they are found remove them. As I have said, on the part of the farmers there is a very active cooperation, but there is a little different feeling in the villages and towns. That refers particularly to plantings in towns and villages where the property is occupied by tenants. They do not care to do this, but the law of our State makes the allowing of barberry bushes to grow on any property illegal. I believe that the State of Minnesota can be looked after after the coming year without any Federal appropriation. I am sure in my own mind, from my own observation, that more has been done during the past year to clean up the State of Minnesota than during the four years before in which the Federal Government was giving assistance.

I believe that with the cooperation of the Federal Government, as it has been extended during the past year, and with the correlation of the State efforts, we can do more in one year than we could probably do in three or four years with a lessened appropriation. Our people have found that this is not only necessary for the State, but that it is necessary for the increased food production of the whole country. We are in a very important spring wheat growing area, and it is an important area in the production of other grains. I believe that it is essential to our agriculture—not only to those engaged in farming, but those engaged in handling agricultural products in the way of milling it, etc., that this be done. We hope that Congress will see fit to make this appropriation in the sum asked for by the representatives of the 13 States that formed this Conference for the Prevention of Grain Rust.

Mr. BUCHANAN. How many of those 13 States have weed inspectors, similar to those in Minnesota?

Mr. REED. North Dakota has. I am not advised with regard to that, but I know that North Dakota has.

Mr. BUCHANAN. It seems to me that that is a highly important matter when it comes to the eradication of any specific kind of injurious bush.

Mr. REED. Yes, sir.

Mr. FULLER. Ohio has a system under which they have 14 inspectors, or weed inspectors. I do not think that is their title, but that is their job. They are charged with keeping down plant pests of various kinds, and they work under the direction of the Department of Agriculture.

Mr. BUCHANAN. Has your State a law by which you can take up and destroy barberry bushes, even against the consent of the owner of the land on which they grow?

Mr. REED. Yes, sir.

Mr. BUCHANAN. Without any court proceedings?

Mr. REED. Yes, sir.

Mr. BUCHANAN. You have never met with any real opposition?

Mr. REED. No, sir; not to that extent. That has been usually met with in the case of tenants occupying property.

Mr. BUCHANAN. They would not care, and they would not want to do it themselves. They would not care anything about the pest themselves.

Mr. REED. Well, if it is on town property, where the bushes have been planted for landscaping purposes, they may think sometimes that the owner would not want to have them changed, but that opposition has not been very pronounced.

Mr. BUCHANAN. The question in my mind is whether they have the proper kind of organization, such as you have in Minnesota, in the other 12 States, so that from the State standpoint it can be done. I make that suggestion because the State authority is the only one that can really supervise it if any opposition should arise.

Mr. REED. Yes, sir.

Mr. FULLER. It might be stated that in Minnesota the law is this: If barberry bushes are found on a man's property, they can be removed without court action, and the cost charged against him like a tax assessment, for which he would become liable. Throughout the entire area, I have heard of only one court case during the entire work of the State, and that was in Illinois.

Mr. BUCHANAN. Do the other States have such laws?

Mr. FULLER. All of the States have laws of varying degrees of severity with regard to barberry bushes. The only law I know of that has not stood up has been the Montana law, and they are trying to get the Attorney General to render a decision that will put some teeth into that law. In the other States the law has proved effective, and the only court case that I know of was in Illinois. That was a case where a woman was brought into court and fined \$25 for having barberry bushes on her property. She appealed the case to the district court and the fine was reduced to \$10, but it stuck.

I will ask Mr. C. W. Hunt, president of the Iowa Bureau Farm Federation, to amplify the situation in Iowa.

MONDAY, NOVEMBER 27, 1922.

**STATEMENT OF MR. C. W. HUNT, PRESIDENT IOWA BUREAU
FARM FEDERATION, DES MOINES, IOWA.**

Mr. HUNT. Gentlemen, the situation in Iowa is about this: We have been working on the eradication of barberry bushes since 1918. In the first four years combined, however, we did not accomplish as much as we have accomplished in the year 1922 up to date. I think there are two reasons for that increase in the success of the work in 1922, one being the fact that we got an increase in the Federal appropriation from \$147,000 to \$350,000. Another reason for the increased interest in the work is the association for the prevention of grain rust, of which Mr. Fuller has spoken, and of which he is the director. In Iowa we have cooperated in the publicity work, and every county in the State that has a farm bureau has cooperated with Mr. Fuller, and in that way we have spread the publicity over the entire State.

We have given a great deal of space to it in the little paper that we publish at the Farm Bureau office, going into the history of the pest, and showing the need for its eradication. Those two things have made it possible in Iowa to do more work in 1922 than was done in the four years preceding. The question of State laws making it possible to eradicate these bushes where the cooperation of the owner of the farm is not given, has been spoken of here. Iowa has such a law, and I think some use was made of that law in two or three instances in the beginning of the work. However, during the last two years, we have had no trouble with any of the people on the farms, and the city people generally are getting well acquainted with the necessity for the eradication of the barberry bushes. Therefore, there is the best cooperation all along the line. In the last year, 28 counties in the extreme northeastern corner of the State have been gone over, the bushes located, and dug out. A lot of that territory along the Mississippi River is some of the worst territory we had to survey on account of the limestone rock and the difficulty in getting the bushes out. We used chemical methods in some places, and cleaned up that section.

With the appropriation of \$500,000 that we are asking for here, I am sure we can clean up all the plants in the State of Iowa next year. There are 36 counties yet to be gone over, all being in the southern and southeastern portion of the State. Some of those counties along the Mississippi River are bad, just as those in the northeast corner, but we can clean them up and probably resurvey the territory that has already been gone over. Therefore, it would seem to me that we probably could get along without any further help after next year. Possibly we might need a little appropriation the year following. Of course, all of you understand that we would have a good deal of resurveying work to do, and it would be necessary to get the sprouts and seedlings as they come on after the original bushes are taken out. The loss from grain rust in Iowa, I might say, is estimated at \$1,000,000, for last year.

Mr. ANDERSON. Do you mean the current year or last year?

Mr. HUNT. That would be the estimate for 1922. The average loss for six years has been about \$1,500,000. A big percentage of

that loss was connected with the oat crop. Iowa is not a heavy wheat-producing State at the present time, due very largely to the damage caused by rust. The farmers did not know at the time that it was connected with the barberry bush, but wheat took the rust and did not yield. They almost quit raising it, which was quite a drawback in the rotation of crops, but they did keep raising oats. They raised quite an acreage of oats, and the loss on oats from grain rust was very great this year. The loss of wheat, of course, in comparison to the amount raised, was in the same ratio.

I just want to cite one field that came to my attention, and that was a 40-acre field of barley. That field was very badly rusted, and they found in a 4 $\frac{1}{2}$ -acre tract a great number of barberry bushes—I think something like 1,000—in that vicinity. That 40 acres yielded 320 bushels and should have yielded 1,400 bushels, making the loss to the owner of that crop on the 40 acres something like \$600. There are other cases, of course, but that had been brought to my attention, and I mention it here to show the extreme damage of this plant.

I think that is about the situation in Iowa, and that is all I have to say, unless somebody desires to ask some questions.

Mr. ANDERSON. We are very much obliged to you.

Mr. FULLER. The next speaker will be Mr. Hill, president of the South Dakota Farm Bureau Federation.

MONDAY, NOVEMBER 27, 1922.

STATEMENT OF MR. W. S. HILL, PRESIDENT SOUTH DAKOTA FARM BUREAU FEDERATION.

Mr. HILL. Mr. Chairman, I represent South Dakota, which is one of the big small-grain producing States in the Northwest and a State which has suffered millions of dollars in losses from black rust. The work of eradication was commenced in our State in 1918, and up until the end of 1921 they had covered about 20 counties. During the past year, 1922, owing to the increased appropriations, they covered 24 counties, so that we have at this time 44 counties which have been covered.

Mr. ANDERSON. Was that all new work or does that include some resurveying?

Mr. HILL. That, I think, was all new work, Mr. Anderson. The entire part of the State lying east of the Missouri River has now been surveyed, but there are still something over 20 counties yet to be covered.

Mr. BUCHANAN. Do barberry bushes exist in all portions of the State?

Mr. HILL. So far they have found barberry bushes in every county they have surveyed. In some counties there would not be many, but they have found some in every county.

Mr. BUCHANAN. How many counties have you in the State?

Mr. HILL. There are about 65 in the State. That map will show what has been covered. This is the part east of the river that has been covered [indicating], and it leaves all this part to be covered [indicating].

A law was passed in 1919 making it a misdemeanor for anyone to keep or harbor barberry bushes on their places after they have been pointed out to them and they know they are present. There is no opposition to the work in our State; in fact, through our farm bureau we have given a great deal of publicity to it and we have the best of cooperation from the farmers. I believe that in another year, with the appropriation that has been asked for, the entire State could be covered and much that has been covered could be resurveyed, so that it would look to me as though another year of vigorous action would pretty well clean up the State, and I believe it is the part of economy and business to keep the appropriation large enough so that this work can be pushed rather than to allow it to drag.

Mr. BUCHANAN. What part does your State take in the work? Has your State contributed anything toward it?

Mr. HILL. So far the State has not contributed anything.

Mr. BUCHANAN. Has it contributed no labor or supervision?

Mr. HILL. Of course they do the work of eradicating.

Mr. BUCHANAN. They dig the bushes up?

Mr. HILL. Yes, sir.

Mr. BUCHANAN. The owners of the land do dig them up and the State compels them to do it?

Mr. HILL. Yes, sir; the State compels them to do it after they have been notified that they have them on their places.

Mr. BUCHANAN. And if they do not do it after they have been notified they are subject to prosecution?

Mr. HILL. Yes, sir; it is a misdemeanor, I think, under the law. The loss from black rust this past year has been much less than in other years; that may not have been altogether on account of this work, but it is a fact just the same, so that I think we are beginning to see the fruits of it.

I am quite a large grower of wheat myself and have been. I lost my crop in 1916, in 1917, in 1919 and 1920, and after that I quit sowing spring wheat. So that the acreage has been reduced in our State very materially as a result of the damage from black rust, and it is quite a problem with the farmers of our country, because the growing of wheat fits into the rotation of our crops and they have not any other crop that will exactly take its place.

Mr. BUCHANAN. They have not many other crops which they can plant, have they?

Mr. HILL. No; but, of course, they can plant corn.

Mr. BUCHANAN. Corn, wheat, and flax?

Mr. HILL. We have some flax, yes, but corn, wheat, oats, rye, and barley constitute our principal crops.

Mr. BUCHANAN. Corn is a little doubtful because of the season, is it not?

Mr. HILL. No; we are a good corn-growing State, but we need the small grains to work into our crop rotations.

I think that about covers the situation in South Dakota.

Mr. FULLER. I want to ask Mr. Silver to make a statement, because Mr. Silver is in a position to view the problem as a part of the general movement in which you gentlemen, as well as ourselves, are interested, namely, agricultural development and the improvement of the agricultural situation generally. Mr. Silver will speak as to the part

of the Federal and State campaign for barberry eradication in its bearing on the food supply of the country.

Mr. HILL. I wonder whether I might add another thing?

Mr. ANDERSON. Yes.

Mr. HILL. I just happened to think of something which occurred near my own farm. As I stated before, I have been losing my wheat crop and I seemed to be pretty nearly the first one in the neighborhood to discover black rust on my wheat, and when the survey was made this last summer barberry bushes were discovered within a mile of my farm and which, I am satisfied, have been guilty of spreading black rust on my crops. A survey had never been made in my county until this past summer.

MONDAY, NOVEMBER 27, 1922.

**STATEMENT OF MR. GRAY SILVER, PRESIDENT AMERICAN
FARM BUREAU FEDERATION.**

Mr. SILVER. Mr. Chairman and gentlemen of the committee: You have heard the statements of the gentlemen from the infested areas and are to hear from the technical men who will follow them. I want to add the voice of the American Farm Bureau Federation in this plea and call attention to the great economic loss that is going on and which can be avoided. The taking of plant food from the soil, the use of the labor and equipment necessary to grow these crops only to have them lost or wasted, are, of course, serious things not only for the farmer but for the consuming public, which means the Nation at large.

The men who have testified do not come here with propaganda or with idle talk; they are here with a message right from their hearts, from the grass roots and from the basic source of supply of foodstuffs of the United States, because these black lands are the surplus producing sections of the country; that means they produce all the surplus foodstuffs that are consumed in the cities and away from the black lands.

When they have gone so far in their home States as to pass laws that give them the right to go on infested properties and take the action that is necessary to aid this eradication, and when they have made the progress these men report, it is certainly a very reasonable thing to ask of the Federal Government that cooperation which will bring about the complete eradication of this great pest, a pest which is causing such great economic losses in the small grains. These people are asking cooperation. They are not asking the Government to do it alone; they are asking cooperation and team work. I want to say that not only the farm bureau members from these States but from other States join with those members in the infested States in asking that you grant this appropriation and in that way assist in this cause.

Mr. FULLER. We have, Mr. Chairman, two technical experts as members of this committee. I am first going to ask Dr. G. H. Coons, plant pathologist of the Michigan Agricultural College, to present some additional aspects of this problem.

MONDAY, NOVEMBER 27, 1922.

**STATEMENT OF DR. G. H. COONS, PLANT PATHOLOGIST,
MICHIGAN AGRICULTURAL COLLEGE.**

Doctor COONS. I want to say, first, gentlemen, that the remarks that these men who represent farm bureaus have made for their particular States hold especially true also for Michigan. It is not alone the men who are on the farms who are interested in this proposition, but I find from my contact with business men, who have something to do with agriculture and who have something to do with the big business enterprises of Michigan, that they are 100 per cent back of this proposition.

This is not merely following out some futile dream, but this is a fight, backed by the best technical advice that we can get hold of, to effect stability in the production of the Nation's food crops.

Michigan is especially concerned with the prosperity of the wheat-growing regions of Minnesota, North Dakota, South Dakota, and so on. Selfishly, Michigan wants those people to continue in the wheat proposition and stay out of the potato business, let us say, so that Michigan can produce the potatoes. We have seen, as a result of these years of failure of the spring wheat crop in those Northwestern States a tendency to go into the potato business, which is viewed with a great deal of distrust and fear by the bankers, by the produce handlers, by the business men, and by all the agricultural interests of Michigan.

I merely mention that as a side light to show that here is a proposition which appeals not alone to farmers. Barberry eradication to prevent black stem rust is intensely popular with the farmers in our State, but it is also a thing which appeals to our business men as a necessary, stabilizing thing to do.

I wish, however, to speak chiefly as a technical man and as a plant pathologist viewing this eradication program. Congress has put its hand to the plow and there is no turning back. If the job is worth doing it is well that the job be done quickly.

You may be interested in a table of statistics on barberry from our State, reduced to the form of averages per county. I find there are on an average of 38 city barberry locations per county and that there are 43 rural locations per county, so that this is more of a farm problem than it is a city problem.

Mr. ANDERSON. You mean existing locations?

Doctor COONS. The locations have been found in the 19 counties which have been surveyed and all have been destroyed. The figures show the average situation. There are also in the counties which have been surveyed an average of 10 escaped areas per county, with an average of 518 bushes per escaped area. Now, then, if eradication is to go on and if the money which has been poured into this campaign is to accomplish its purpose, it is necessary, it is vital, that all haste be made and that great emphasis be placed on the quick handling of this situation before these escaped areas become so numerous and so large that the job of cleaning them up becomes too large for us.

If this job of eradication is not done in the next two to five years it is going to be a proposition that will cost one hundred times, at the

very lowest estimate, what it will cost at the present time. I tremble to think of what is going to happen to the small-grain crops of Michigan, to say nothing of the northwest areas, if the barberry continues to increase in our dune lands and in our waste lands, which occupy so large a part of the northern part of the Southern Peninsula of Michigan.

Mr. BUCHANAN. Does it increase rapidly?

Doctor COONS. Around a bush perhaps 100 seedlings or more can be seen readily, which represent the increase of a single year, and if you can see 100 seedlings in an area the size of this table, who can estimate the number of seedlings that have been carried here, there, and everywhere by birds, and which escape detection? So I should say its progress is extremely rapid.

Mr. BUCHANAN. It will reproduce from the seed?

Doctor COONS. Yes, sir.

Mr. BUCHANAN. How large are the seeds?

Doctor COONS. They are about the size of a kernel of wheat and these are eaten by birds in the wintertime.

Mr. BUCHANAN. Will stock eat them?

Doctor STAKMAN. There was one rather interesting thing in Pennsylvania. They found that cows browsed on the berries in pastures, and, as a matter of fact, they counted about 45 seedlings from a single bush.

Doctor COONS. I would like to comment as a technical man on the method of handling this barberry eradication program. I think Congress has proceeded in exactly the right fashion in giving strong, central support to this movement, heading up the entire program, and enlisting the cooperation of all of the States in this grain-growing area, and proceeding in a vigorous, orderly fashion to cover the territory by a definite farm-to-farm survey and not being satisfied with merely telling somebody else to go and do it. With the amount of money that was spent in the first years the progress was, I should say, slower than the actual increase of the barberry. The amount spent then was something like \$150,000.

With the amount spent this last year in the entire barberry area, \$350,000, the progress has been much more gratifying, because where before something like five counties in Michigan were covered per year by a farm to farm survey, under the apportionment given to our State, something like 15 counties were covered in this last year thoroughly and effectively. While we can not make any such favorable report as the gentlemen who have preceded me as to the end being in sight in a year or two, at any rate we can say that the job of covering the State of Michigan is going to be accomplished within a reasonable time and is not going to be dragged out over a 20-year period. My opinion, as a person dealing with plant pathological subjects, is that Congress should not think at all of reducing this appropriation, but should rather think of putting in more money, putting in as much money as can be handled economically, so as to control this pest immediately.

My last statement will be a very brief one, and it will be that the common concensus of opinion of plant pathologists is that this move of eradicating the barberry is the logical and first step toward the control of the black stem rust.

Mr. BUCHANAN. Is there any second step?

Doctor COONS. Usually we take the second step after the first step is taken, but this is the first and the important step.

Mr. BUCHANAN. What I want to know is whether there is any other bush concerned except the barberry bush?

Doctor COONS. No; there is not.

Mr. BUCHANAN. Then if we take the first step, and there is no second step, and we completely eradicate it, we are through with the problem?

Doctor COONS. We will be through with the problem as far as great epidemics, which sweep the country, are concerned. I do not know whether anyone would want to make the statement that the rust would absolutely disappear with the eradication of the barberry, but I do not believe scientists would want to go that far. You know, we are conservative.

Mr. BUCHANAN. You are cautious?

Doctor COONS. Yes. But we believe that the eradication of the barberry will result in the stopping of the great epidemics which have heretofore swept over the country, because we are all convinced that these great epidemics start with the barberry bush and sweep over the country from the momentum they derive from this early start in the spring.

Mr. FULLER. The next gentleman who will discuss this proposition will give you, possibly, a more specific answer to the question you have just put, Mr. Buchanan, a question which has occurred to all of us, namely, will barberry eradication actually accomplish what we are claiming for it? Dr. E. C. Stakman, plant pathologist of the Minnesota College of Agriculture, was borrowed last summer by the United States Department of Agriculture and sent to Europe to find out what had been done over there. His story is of tremendous interest and has a very important bearing on your consideration of this question.

MONDAY, NOVEMBER 27, 1922.

**STATEMENT OF DR. E. C. STAKMAN, PLANT PATHOLOGIST,
MINNESOTA COLLEGE OF AGRICULTURE.**

Doctor STAKMAN. Mr. Chairman and gentlemen, the question has always arisen as to whether the eradication of the barberry would absolutely control the black-stem rust. We did not know exactly about that situation in this country because the experiment had never been made on a large enough scale. We did know that in certain areas where the barberry has been for years there had been heavy rust and that when the barberries were removed the rust disappeared. But there were no available experiments on large areas. We knew that some barberry eradication work had been done in Europe and that Denmark had solved this problem by eradicating the barberries, but we did not know much about the situation in the rest of Europe. So I obtained leave of absence from the university last year and the Department of Agriculture asked me to go over there to find out what had been done in Europe.

I found, in the first place, that western European countries had taken out practically all the barberries from the agricultural districts;

that is, from the principal grain-growing districts. I found they had accomplished that either by law or just simply on-account of the fact that the farmers had become so convinced that they could not grow grain where there were barberries that they took them out without the compulsion of law.

In England they have taken out nearly all of their barberries; they have never had a law, however, and it has taken them a long time. But to-day they are about 125 years ahead of us on this barberry eradication, because English farmers, about 1800, commenced to realize that they could not profitably grow small grains where there were a great many barberry bushes. So they simply got together and started to take the bushes out and have been taking them out ever since, so that at the present time there are practically no barberry bushes in the grain-growing regions of England.

In Rouen, France, they passed a barberry eradication law in 1660, but, on account of various other difficulties they had over there that law was never enforced very rigorously. However, since that time a great many of the local political units have passed eradication laws so that at the present time, as the result of these laws, there are scarcely any barberries in the agricultural districts of France. I traveled a great many miles by automobile and saw but few barberry bushes in the agricultural districts. Of course, there are still barberry bushes in the mountains, in the Pyrenees Mountains, in the Jura Mountains, and in the Alps. They are still growing some grain there but they can not grow much. However, in the principal grain-growing regions there are practically no barberry bushes. The preamble of one of the laws they passed struck me rather forcibly. That law was passed in 1891. They started it with the usual preamble, in which they said: "Whereas, it has been amply demonstrated that the presence of the common barberry is a veritable scourge to grain fields."

They said it with all of their French enthusiasm and then they went ahead and passed their law, and as the result of that law there are practically no barberry bushes in the principal grain-growing regions. although, as I say, they are to be found in the mountains.

In Italy the same thing is true. There are very few barberry bushes except in the mountains.

In Greece they are all over the mountains but there are not so many in the agricultural districts, and the same thing is true throughout the Balkans.

The old Austro-Hungarian Empire passed a law about 1898 as the result of which they have gotten rid of practically all the barberry bushes in the present States of Hungary, Czechoslovakia, and those other smaller countries now belonging to Serbia, and other countries near there which formerly belonged to the Austro-Hungarian monarchy. The Hungarians were so firmly impressed with the beneficial effects of that law that the present State of Hungary simply reenacted the law requiring that all of the remaining barberry bushes be taken out, so that there are practically no barberry bushes in the territory which previously belonged to Austro-Hungary, except in the mountains and in some of the waste lands.

In Germany the same thing has been done. The kingdoms, duchies, grandduchies, and other political units there passed laws beginning approximately about 1865—although there had been some

passed before that, 1800 and along about that time—requiring the eradication of the common barberry bushes.

Denmark, as we all know, passed a barberry law in 1903, and as a result of the beneficial effects of that Danish law the common barberry has been eradicated from that country. A barberry law has been enacted in Bavaria, in southern Germany; one has been enacted in Sweden and one in Norway. So that in practically all of the countries of western Europe there is now legal provision for the eradication of the barberry.

The question in which we are particularly interested is: What has been the result of the taking out of these barberry bushes? In England all of the pathologists and agronomists—and even the practical farmers—with whom I talked told me they were absolutely convinced that the black stem rust could not exist in England without the common barberry bush. I traveled a great many miles by automobile and the only barberries I saw in England proper were those which a professor of botany at Cambridge had kept for experimental purposes, and that was the only place also in which I saw the black stem rust in England.

They told me this was not an exceptional year; that they had that same experience year after year and that when they wanted black stem rust for experimental purposes they had to go out to those barberry bushes which still exist in Scotland or Wales, where there are still some common barberry bushes. So, in England proper, they have eradicated all of their barberry bushes from the agricultural districts and they know very little, if anything, about the black stem rust because they simply do not have it. I talked with a prominent investigator, at Cambridge—he having studied the situation in England for several years—and he told me he was absolutely convinced that black stem rust could not exist in England without the common barberry.

In Wales I made a long automobile trip and we could find no black stem rust whatever for a great many miles, and I became very lonesome. Finally we stopped at a field and found a little on some wheat. We asked the farmer whether he knew of any barberries in the region, and he said he could not tell us. We asked him whether he knew what barberries were, and he said he did not, but when we asked him whether there were any pryn melin in that neighborhood—that being the Welsh term for barberries—he said there were, and he said the schoolmaster had been keeping barberry bushes right across the road, and we could trace the rust very nicely from those barberry bushes on to this farm.

We went still farther into Wales and we could find no black-stem rust at all, except where we found barberries and where we found them there was plenty of black-stem rust. There was one field in which it was particularly present and it impressed me very forcibly. In that field there was a very marked attack of black-stem rust, and although I did not know where the barberry bushes were I knew they were in that general region. I asked whether they were over in that direction and the man to whom I was talking looked around and said: "That is exactly where they are." He wanted to know how I knew they were on that side, and the way I knew was this: There was a very heavy attack on that particular side of the grain; the grain was literally covered with rust on that side, showing that

the rust had just simply been blown to that side of the grain from those barberry bushes, which were about a half mile away from this wheat field, and had attacked that side of the stem. It was a perfectly clear situation, and in Wales I became absolutely convinced that black-stem rust does not exist except where there are common barberry bushes.

I found the same thing true in France. I made a long trip through France, and I could not find any black-stem rust at all until I went up into the Alps Mountains, where there are immense numbers of barberries. I have never seen barberries more heavily rusted than these were, and this at a time when you could not find rust anywhere else in France. We stopped at a little town called Briançon, where they grow quite a bit of rye. There they have not eradicated the barberry bushes. There I saw a peasant woman, and I asked her whether they had any black-stem rust. She said they had. I asked her whether she knew what rust was, and she said she certainly did, that she was very familiar with it. I asked her whether she knew where it came from, and she said she did, that it came from the barberry bushes. I asked her whether they ever suffered much damage from it, and she said they always did. I asked her if it did any damage to wheat, and she replied it did not, for the reason that they do not grow any wheat there, because it always rusts so badly they can not grow it. I asked her why they did not dig out the barberry bushes, and her answer was that they make a very nice preserve out of those berries, and their rye does not amount to very much anyway. But the important thing is that in all of the great wheat-growing areas of France there was not a single bit of black-stem rust, while in the Alps Mountains and in the Jura Mountains, where there are a great many barberries, there was a tremendous amount of rust.

Even down in Spain, where one would expect the summer stage of rust to live over the winter and to be independent of the barberry, it apparently is not independent of the barberry, because there they have practically no black stem rust or very little black stem rust except in the mountains where there are a great many barberry bushes. All of the people with whom I talked in Spain said that the rust appeared earlier on the grain and grass near the barberry bushes, and that the rust seldom did any damage except in the immediate neighborhood of the barberry bushes or in the regions where there are many barberry bushes.

I talked with Italian agronomists and plant pathologists and made observations myself. They told me that in the southern part of Italy, where there are no barberry bushes, the black stem rust did not amount to anything, but that in the northern part of the country, where there are a great many barberry bushes, the black stem rust does a lot of damage. There was one interesting case of barberry eradication about 60 miles southeast of Rome. In 1914 they found an outbreak of black stem rust; they looked the situation over and found some barberries. They removed about half of them the same year, and the next year there was no rust near the place from which the barberries had been removed, but there was rust near the remaining barberry bushes. They took out the remaining barberry bushes, and the next year the rust failed to develop and since then they have had no rust in that particular region.

In Austria-Hungary the farmers and others told me that they had not seen common barberry bushes since about 1898, or before that

time, and that they paid no attention to the black stem rust. When I asked them what they knew about the black stem rust they said they did not pay any attention to it and did not consider it of major importance at all.

Mr. BUCHANAN. How about the climatic conditions being the same?

Doctor STAKMAN. The climatic conditions are not essentially different from those there; they have about the same conditions as we have in the upper Mississippi Valley.

In southern Germany I looked for rust for a long time, in Bavaria, particularly, but could not find any at all; absolutely none. They told me at their experiment station I would not find any and they told me the truth. They told me that if I wanted to find rust I should go to the mountains, where there were a great many barberry bushes, and that if I went there I would be practically sure to find rust. I did find a great many barberry bushes and every place the bushes existed there were heavy attacks of rust. The situation was just as clear as it possibly could be. In the rest of Germany they have practically eradicated the barberry bushes, and the pathologist at the Imperial Biological Institute, where they do their plant-disease work, told me that whenever there was a serious outbreak of black stem rust they simply went to the particular farm or farms from which it was reported and asked the owners where the barberry bushes were.

If the owners said there were no barberry bushes they simply asked permission to look around and they nearly always located the barberry bushes. They cited instance after instance in which that very thing had happened, and that they could actually trace barberry bushes by the development of serious local outbreaks of black-stem rust.

In Sweden they now have a law for the eradication of barberry bushes, but it has only been in force for a couple of years, and on account of the misguided enthusiasm of one or two people the law is not particularly effective. They told me, and I saw with my own eyes, that there is a very definite and distinct relationship between the occurrence of black-stem rust in Sweden and the millions of barberries along the southeastern coast and up along the eastern coast of Sweden. There are a great many barberry bushes in that region, and it is there that they suffer particularly from black-stem rust. In this country we think of the black-stem rust damaging wheat, but if anybody thinks that the black-stem rust attacks only wheat and only does damage to wheat he should see the situation in Sweden, because I saw oat fields there simply black with rust and which were very seriously damaged, at the same time the yield being very greatly lessened.

I saw rust over there on bluegrass and on various other grasses on which we seldom find black stem rust in this country. I have never seen any rust on oats in this country to compare with the severity of the rust in Sweden. In Sweden, over toward the mountains, there are no barberries, and barberries will not grow because there is not as much limestone in the soil over there as is necessary for the growth of barberries. For years and years Swedish agriculturists and pathologists have gone to see if they could find any black stem rust in that region, but they have always come back with the report of no black

stem rust. Then they finally got a report that there was some black stem rust in one place over there and Professor Henning, of Stockholm, one of the most eminent authorities on cereal diseases in the world, went up there and he found there was a heavy outbreak of black stem rust and traced it to a number of barberry bushes, and that is the only place in western Sweden where they have yet found black stem rust.

In Norway the situation is exactly as clear. Wherever there are barberries there are very heavy attacks of black stem rust and where there are no barberries there are no attacks of black stem rust, so that plant pathologists and agronomists are absolutely convinced that rust can not exist independently of the barberry.

I suppose the situation in Denmark is about the clearest of any of them. They had very severe epidemics of black stem rust in Denmark in which the conditions are quite similar to those in the upper Mississippi Valley. As a matter of fact, they started a barberry war along in 1805. The farmers insisted that the barberry bushes be taken out but some of the owners of the bushes in the cities and villages insisted that they should not be taken out. They had a very severe epidemic every three or four years and sometimes every other year. There are records going back to 1888. They had a very destructive epidemic in 1888, another one in 1889 and still others in 1894, 1896, 1897, and 1901. Then they decided they had had about enough for awhile, so the farmers insisted on the passage of a barberry eradication law and such a law was passed. Denmark is a small country, and, after the passage of that law, they commenced the work thoroughly and they had practically eradicated all of the barberry bushes by 1904. Since that time they have not had a single serious outbreak of black stem rust, and that is 19 years. I asked them whether they would be sure to detect an outbreak of black stem rust if they had one and they assured me they had agricultural experts in the various parts of the country who would detect the slightest attack of rust and that they are all reporting to the central laboratory, and in all of these years they have been practically unable to find any black stem rust in Denmark, although in some of the large grain areas they have found a little bit here and there and they can trace it to some barberry bush.

I made a long trip through Denmark and found no black stem rust on oats or other grains, but finally we came near the Copenhagen municipal forest and found a trace of rust here and there as we came closer to the forest, and when we got nearer the forest we found it was pretty heavy. We asked the forester whether he knew of any barberry bushes in the woods, and he said he knew there were some there. We asked him whether they had been rusted, and he said they not only had been rusted but they were still rusted. We looked for the barberry bushes and found them, and that was the only place in Denmark where I could find any black stem rust, and the only damage done to grain at all was near these common barberry bushes.

So the situation in Europe is perfectly clear. In the first place, they have eradicated practically all their barberry bushes from the agricultural regions. It will be impossible for them to eradicate them all from the mountains, and for that reason they will never be absolutely free from the rust, but they do not fear it like we do in this country. They do not have the terrific epidemics we have in this

country and have not had them since eradicating their barberry bushes, and when they do have the black stem rust they trace it to barberry bushes.

It has taken them a long time to get rid of their common barberry bushes, and it seems to me it is going to take us a long time to get rid of them, although we can get rid of them if we can go after them intensively in the next two or three years. If we do that we will cut the number down to such a point that the weed inspectors and other State authorities, as well as the children who are being educated up to the needs of the farm, can simply locate and eradicate the remaining bushes.

Just one or two things more. I want to emphasize the fact that Europe has controlled the black-stem rust by the eradication of the common barberry. They do not fear the black-stem rust in western Europe and it seldom appears at all, and when it does appear it is too late to do much damage. If they can solve their rust problem over there we can do it here. The German pathologists laughed at me when I told them we were carrying on this campaign in the United States, and they asked me why the farmers did not take out the barberry bushes. I told them some people did not believe in it; at least did not believe in it thoroughly enough to support it very vigorously, and that some people thought it was an experiment. They actually laughed at me and said, "The thing is absolutely settled in this country; there is nothing to it at all."

I want to emphasize the fact that we must not get the idea that this disease is destructive only to wheat. In Sweden, in the spring-wheat-growing region and in the southern part of the country, it is apparently as destructive to oats as it is to wheat; it is also destructive to barley and rye, and so it goes as to all of our common small grains. Not only that, but in Sweden, where there are tremendous numbers of bushes it was even affecting their pasture grasses. So it seems to me we are not dealing with an experiment but we are dealing with a big problem and one that has been solved in Western Europe. It is a problem that can be solved in this country and I am absolutely and firmly convinced that the best way to solve it is by attacking it very vigorously for the next—I will be a little more conservative than some of these men—two or three years at least, and then after that we ought to get rid of practically all of the bushes, except those which can be eradicated by the children who are growing up, by the weed inspectors, and by these various other agencies. In connection with that we have got to do a lot of educational work because it is a big job. I have not a thing to do with the barberry eradicating program and I am simply saying this because I am so firmly convinced it has got to be done. I sincerely hope financial facilities will be provided which will make it possible for us to go ahead and solve the problem in this way. I thank you.

Mr. ANDERSON. Are you familiar with what has been done in this country?

Doctor STAKMAN. Yes; that is, I was familiar with what has been done in this country until this summer. I was away all summer, so that I have not caught up as yet with what has been done this summer.

Mr. FULLER. I have a great deal of information, in one form or another, with regard to the work done in the past year.

Mr. ANDERSON. What proportion of these 13 States have been surveyed for the first time?

Doctor STAKMAN. The cities and towns have been surveyed in all the 13 States, and as far as the country districts are concerned I should say possibly about half or more; that is, as far as the farm to farm survey is concerned. May I make just one more statement? I just want to point out the destructive effects of a single barberry bush. This is a statement made by Doctor Jackson, of Indiana, who has been one of the most conservative of the plant pathologists in connection with this barberry eradication campaign. He says:

One thing that has greatly interested us this summer and on which Mr. Beeson, our State leader, made a special study, was an outbreak of stem rust that started from one barberry bush. It traveled in one direction, at least, for about 5 miles. The area was pretty carefully surveyed and I have a report here containing figures given by the farmers themselves on 18 out of perhaps a total of twice that many farms. The total wheat acreage was 963 acres. The average yield due to stem rust was 8.1 bushels. The average estimate of yield had there been no black-stem rust was 21.4 bushels. The average crop this year was then 37 per cent of what it would have been without the black-stem rust. The total lost in yield was 12,520 bushels or an average loss of 696 bushels. At a dollar a bushel each farmer lost \$696 worth of wheat. The combined money loss was \$12,520.

That was very clearly traceable to a single barberry bush in the southern one-third of Indiana. I have a great many similar cases, but I was interested in that because Doctor Jackson has been so conservative on the thing.

Mr. FULLER. I can answer in part the question which you just asked, Mr. Anderson. Dr. F. E. Kempton, the leader of the campaign of barberry eradication for the United States Department of Agriculture, made this statement at our recent meeting in St. Paul:

A total of 172 counties were covered, as against 86 in each of the two preceding years.

During the entire campaign since 1918 an area of 512 counties has been covered in the farm-to-farm survey. The total number of bushes found was 5,806,643. Of these 5,142,843 were destroyed.

With reference to the future he made this statement:

A large area remains to be covered by our original farm-to-farm survey. At the rate we went this year, it is possible that next season we can complete the survey in Minnesota, North and South Dakota, Iowa, and Nebraska.

Without knowing how many counties there are to be covered we could not give you the geographical proportion which has already been covered.

Mr. ANDERSON. Judging from the map I have before me all of the territory of Minnesota has been surveyed, that survey having apparently been completed this year.

Mr. FULLER. Not all of it, I think, Mr. Anderson. There are a few counties in this area here [indicating on map].

Mr. ANDERSON. But most of those on this map are marked as probably not needing surveys.

Mr. FULLER. This is Doctor Kempton's map. We still have a few moments of time and I would like to make an additional statement. I want to tell you something about the work of the organization which we represent. I told you what we had done in the way of sending out publicity material, and it will interest you to know that we have expended in that work up to date about \$50,000; we will have spent by the 1st of March about \$60,000, and we are planning

on a budget of about \$75,000 for the calendar year 1923. That money, you understand, is raised by private interests who have the welfare of the agricultural regions at heart and whose prosperity is dependent directly upon the amount of grain which is produced.

Several questions were asked with regard to laws in the various States. If it is the desire of the committee I shall be glad to file in the record a summary of all the laws.

Mr. BUCHANAN. I would like to have it.

Mr. FULLER. This is a summary of the laws in all the States.

(Said laws follow:)

The common barberry is an outlawed plant in all of the 13 North-Central States in which the Government agents are removing the bush. Each State has a special statute or executive order, with the force of law, under which the Federal forces work when there is any question of their authority to destroy the barberries discovered in their survey.

While the antibarberry laws are effective and enforceable, it seldom is necessary to invoke the statutes, State leaders report. The Government agents have been instructed to get the barberries out by educational methods, benevolent coercion, and moral suasion, being recommended instead of legal procedure. Owners of bushes rarely refuse to remove them, but in case they do the field assistants have the means to compel action.

The State laws generally recite the damage caused by the common barberry bush as a spreader of black stem rust to small grains and then prohibit the sale, transportation, planting, or growing of the shrub. The State department of agriculture usually is charged with enforcement. Most of the statutes provide for notifying property owners of the presence of barberries and ordering their destruction. If action is not taken in a given time, the work then may be undertaken by the State and the cost charged back against the property in the form of special taxes.

Many of the laws, in branding the common barberry as a pest, make it plain that the Japanese barberry, which is not a rust-bearing plant, is not included in this designation.

The Colorado regulations were announced by the State entomologist by virtue of authority vested in him by the amended horicultural inspection act of 1917. He issued an order establishing a quarantine forbidding the shipment of common barberries into Colorado or the transportation of the bushes within the borders of the State. The order further directed the extermination of harmful barberries wherever found. It became effective July 25, 1919. Noncompliance with a notice to remove bushes is made punishable by a fine of from \$5 to \$500, and the owner also is required to pay the cost of eradication if done by public officials.

Under the Illinois plant inspection act of 1917 the State department of agriculture has issued an official notice designating the common barberry as a pest and ordering its eradication. The law requires property owners to dig up their bushes when instructed to do so by the department of agriculture. In case of refusal or neglect to carry out such orders the State may do the work and the cost constitutes a lien against the property. Importation of the harmful barberry into Illinois is prohibited by executive order and violation may be punished by a fine of from \$500 to \$5,000. The violation of an order to remove bushes is a misdemeanor and is punishable by a fine of from \$10 to \$100.

The antibarberry regulations in Indiana became effective November 29, 1919, through an order of the State department of conservation, acting under authority of a legislative act passed in 1919. Owners of bushes were given until December 31, 1919, to get rid of their common and purple barberries. Possessing rust-bearing bushes now is punishable by a fine of from \$10 to \$300, to which may be added jail terms of from 30 days to 6 months.

The Iowa law became effective in February, 1919. It makes it unlawful to sell, transport, or permit to exist any species of the harmful barberry. The State entomologist is charged with notifying property owners of the presence of bushes. If they do not remove them within 10 days the State may do the work and charge the cost to the property to be collected as a special tax.

Michigan outlawed the common barberry in a law passed in 1919. The State inspector of orchards and nurseries is charged with ordering the destruction of harmful varieties. If the bushes are found growing wild outside the corporate limits of any city or village and the owner of the property refuses to destroy them, the State may do the work and charge half of the cost back against the property. If the barberries have

not been infected by rust spores the owners of all eradicated bushes are entitled to recompense for the actual value of the plants.

The Minnesota law was passed in 1919. It forbids the maintenance, propagation, sale, or introduction into the State of harmful barberries and makes it the duty of property owners or occupants to destroy their barberries forthwith. The State entomologist is designated as the enforcement officer. He is required to notify owners of the presence of bushes, and they then are granted 10 days in which to remove them. If they refuse or neglect to do so, the work may be done by the State and the cost collected from the property owner by the county attorney. Violation of the act is made a misdemeanor.

The State board of horticulture is made responsible for the enforcement of Montana's stringent law. It provides for giving notice of the presence of harmful barberries and requires their removal within 10 days. If the owner does not destroy them, the State horticultural inspector may have the work done and the cost charged against the property in the form of taxes. Violation of the act is made a misdemeanor punishable by a fine of from \$10 to \$25. The sale and transportation of the bush is prohibited as well as its possession.

In Nebraska the antibarberry law is enforced by the sheriff of each county. The plant pathologist of the State experiment station is required to inform the sheriff of places where the bushes are growing. The sheriff then sends a written notice to the property owner. If the bushes are not removed in 10 days, the sheriff may order the work done and the cost collected as special taxes. The law was passed in April, 1919.

North Dakota's law was passed in March, 1917, and carried the first public appropriation ever made for barberry eradication. The commissioner of agriculture and labor was required to make rules relating to the most convenient and expedient method of eradicating rust-producing bushes, and \$5,000 was provided for the work. It also was made the duty of the board of county commissioners in every county to order and cause the eradication of barberries. Provision was made for notifying the owners of bushes who were required to dig them up within 10 days. Failing to do so, the county commissioners or State commissioner of agriculture were authorized to do the work, the cost of which constituted a lien against the land. Refusal to dig the bushes is a misdemeanor, punishable by a fine of not more than \$25.

The chief of the State bureau of horticulture enforces Ohio's plant pest law under which barberry eradication is required. The statute contains the usual provisions prohibiting the transportation, sale, or possession of disease spreading plants and requires removal in 10 days after notice from the secretary of agriculture. Provision also is made for doing the work at public expense if the owner refuses to do so, and collecting the cost as taxes. Violation of the act is made a misdemeanor with the maximum fine fixed at \$100. The probate court is given jurisdiction over cases arising and prosecutions take precedence over criminal cases.

South Dakota passed a law in February, 1919, making it unlawful for any person to permit any harmful barberry to exist on his premises or to offer the bush for sale. The State entomologist is required to enforce the act as a police regulation of the State. After receiving removal notices property owners are given 30 days in which to eradicate their bushes. In case of failure to dig them up the State entomologist may order the work done and collect the cost as taxes. Violation of the act is a misdemeanor punishable by a fine of from \$25 to \$500.

Barberry eradication is required in Wisconsin under the terms of the crop pest and nursery inspection act passed by the legislature of 1915. The importation of the harmful varieties is prohibited by the 1919 statutes. After forbidding the shipment, sale, or growing of the outlawed barberries the act authorizes the State entomologist to eradicate the plants. Upon being notified the property owner has 10 days in which to remove his bushes. After that the State may do it and charge the cost to taxes against the premises. Violation of the law is a misdemeanor. The fine is from \$25 to \$500.

The Wyoming law was passed in 1921. It contains the usual provision against transport, planting, and sale of the harmful barberries and makes it the duty of the State board of horticulture to cause the eradication of rust-bearing varieties. If the owner of the land on which the barberries are found growing refuses to remove them within 10 days after receiving a written notice to do so the State does the work and collects for it by levying special taxes against the land. Violation of the statute is a misdemeanor and the fine is from \$10 to \$25.

Mr. FULLER. I would like to call the attention of the committee to the losses from black stem rust. You will recall that the statement has been made, based upon figures prepared by the plant disease survey, that the average annual loss from black stem rust

during each of the three years 1919, 1920, and 1921 was 50,000,000 bushels. That is a very close approximation. I have here an estimate of the loss due to black stem rust in 1922 showing an aggregate loss in the area in which we are interested, of 61,973,000 bushels. I think that statement is exaggerated owing to the fact that the North Dakota estimate is obviously much too large. I would like to have this statement included in the record. These figures were prepared by the plant disease survey of the United States Department of Agriculture.

(Said statement follows:)

Losses due to black stem rust in 1922.

| | Production. | Percentage lost. | Bushels lost |
|-------------|---------------|------------------|--------------|
| Wheat..... | 810,123,000 | 4.9 | 41,833,000 |
| Barley..... | 196,431,000 | 1.8 | 3,659,000 |
| Oats..... | 1,251,156,000 | 1.6 | 19,987,000 |
| Rye..... | 79,623,000 | .1 | 89,000 |

These are simply preliminary estimates, of course, and are subject to change. Of the 13 States included in the area of our campaign, Colorado, Wyoming, and Montana do not report any loss. These are the States in which eradication of the common barberry is practically complete. The other 10 States in our area report losses in the three more susceptible crops as follows:

| | Wheat. | Barley. | Oats. |
|-------------------|-------------|------------|------------|
| Illinois..... | 244,000 | 27,000 | ..... |
| Indiana..... | 257,000 | ..... | ..... |
| Iowa..... | 32,000 | 274,000 | 2,149,000 |
| Michigan..... | 288,000 | ..... | 1,102,000 |
| Minnesota..... | 1,705,000 | 242,000 | 2,735,000 |
| Nebraska..... | 562,000 | 52,000 | 616,000 |
| North Dakota..... | 133,244,000 | 12,266,000 | 11,128,000 |
| Ohio..... | 721,000 | 9,000 | 241,000 |
| South Dakota..... | 1,186,000 | 474,000 | 801,000 |
| Wisconsin..... | 179,000 | 308,000 | 1,045,000 |
| Total..... | 38,418,000 | 3,650,000 | 19,817,000 |

¹ The figures for losses in North Dakota have been questioned, and it is doubtful if they will be sustained when final estimates are made. It is probable that, although the losses in North Dakota were undoubtedly large, these figures will be materially reduced, thus reducing the totals.

In Nebraska, Ohio, and South Dakota there were losses of rye aggregating 88,000. This figure, added to the totals for wheat, barley, and oats as given, makes a grand total of 61,973,000 bushels as the loss during the past season due to black stem rust in the area which we are trying to free from barberries.

Mr. FULLER. I should also like to include in the record the resolutions which were adopted at our meeting on the 14th of November in St. Paul, appending to those resolutions the signatures of the 39 delegates representing the 13 States.

Mr. ANDERSON. Without objection the resolutions may be inserted in the record.

(Said resolutions follow:)

Whereas observation and experience during the past year have strongly reinforced the fact that the common barberry is the vitally necessary factor in the dissemination of black stem rust and have proved conclusively that eradication of the common barberry is essential to the continued growing of grain in the north central part of the

United States, and consequently, to the continued prosperity of the region and the Nation as a whole; and

Whereas Congress appropriated the sum of \$350,000 for barberry eradication during the fiscal year 1922-23, which, in our opinion, has been most wisely and effectively used, with the result that tremendous progress has been made in the solution of this great problem; Now therefore be it

Resolved, That the conference for the prevention of grain rust reaffirm its confidence in barberry eradication as the solution of the problem of black stem rust; and be it further

Resolved, That we earnestly urge Congress to appropriate not less than \$500,000 for barberry eradication during the ensuing fiscal year.

Whereas enforcement of eradication of common barberry bushes, by reason of the police power involved, is preeminently State function, and certain phases of barberry eradication can only be accomplished through State agencies; Now therefore be it

Resolved, That this conference earnestly urge every State included in the barberry eradication campaign to make adequate appropriation through its legislature for these phases of the work, and to memorialize Congress in behalf of a Federal appropriation of not less than \$500,000 for barberry eradication during the ensuing fiscal year; and be it further

Resolved, That the delegates to this conference pledge themselves to do all in their power to promote the most effective cooperation on the part of their respective States.

DELEGATES IN ATTENDANCE AT THE SECOND ANNUAL CONFERENCE FOR THE PREVENTION OF GRAIN RUST.

STATE DELEGATES.

Colorado: L. M. Taylor, secretary, State board of agriculture, Fort Collins; Dr. A. K. Peitersen, botanist, Colorado Agricultural College, Fort Collins.

Illinois: Frank I. Mann, representing the Illinois Agricultural Association, Gilman; O. T. Olsen, superintendent, division of plant industry, State department of agriculture, Springfield; George H. Dungan, associate in crop production, agronomy department, University of Illinois, Urbana.

Iowa: C. W. Hunt, president, Iowa Farm Bureau Federation, Des Moines; I. E. Melhus, station plant pathologist, agricultural experiment station, Ames.

Indiana: James K. Mason, director, Indiana Federation of Farmers' Associations, Milton; Dr. H. S. Jackson, chief in botany, agricultural experiment station, Lafayette. (Representing Gov. Warren T. McCray.)

Michigan: James Nicol, president, Michigan Farm Bureau Federation, South Haven; John A. Doelle, commissioner of agriculture, Lansing; W. F. Reddy, State leader of barberry eradication, East Lansing.

Minnesota: J. F. Reed, president, Minnesota Farm Bureau Federation; N. J. Holmberg, commissioner of agriculture, St. Paul; Dean E. M. Freeman, College of Agriculture, St. Paul; Leonard W. Melander, State leader of barberry eradication, St. Paul.

Montana: A. H. Stafford, president, Montana Farm Bureau Federation, Bozeman.

Nebraska: H. D. Lute, secretary, Nebraska Farm Bureau Federation, Lincoln; Dr. George A. Peltier, station plant pathologist, agricultural experiment station, Lincoln.

North Dakota: Gov. R. A. Nestos, Bismarck; Hans Georgesen, president, North Dakota Farm Bureau Federation, Niagara; Joseph A. Kitchen, commissioner of agriculture and labor, Bismarck; Dean H. L. Bolley, College of Agriculture, Fargo; George C. Mayoue, State leader of barberry eradication, Fargo.

Ohio: A. E. Anderson, director grain marketing department, Ohio Farm Bureau Federation; L. J. Taber, director of agriculture, Columbus.

South Dakota: W. S. Hill, president South Dakota Farm Bureau Federation, Mitchell; Frank M. Byrne, commissioner of agriculture, Pierre. (Representing Gov. W. H. McMaster.) M. R. Benedict, assistant commissioner of agriculture and professor of farm economics, College of Agriculture, Brookings; Dr. Arthur T. Evans, associate agronomist and crop pathologist, College of Agriculture, Brookings; Dr. N. E. Hansen, professor of horticulture, College of Agriculture, Brookings.

Wisconsin: George W. McKerron, president Wisconsin Farm Bureau Federation, Madison; C. P. Norgord, commissioner of agriculture, Madison; Dr. S. B. Fracker, State entomologist, State department of agriculture, Madison; William A. Walker, State leader of barberry eradication, Madison.

Wyoming: Dr. A. F. Vass, professor of agronomy, College of Agriculture, Laramie.

Delegates at large: J. R. Howard, president of the American Farm Bureau Federation, Chicago; Franklin M. Crosby, representing milling companies, Minneapolis; C. C. Webber, representing implement dealers, Minneapolis.

Mr. FULLER. In brief, the resolutions earnestly urge that the Congress appropriate not less than \$500,000 for barberry eradication during the ensuing fiscal year.

If you still have a moment to give us, I want to summarize very briefly what we believe we have shown.

In the first place, we have shown that barberry eradication does mean the control of black stem rust in the solution of the problem in which we are interested.

In the second place, we have shown that barberry eradication is perfectly possible and perfectly practicable and that the speed with which it is accomplished depends upon the energy and the money used in attacking the problem.

We have shown, and you have also, the statement of the Department of Agriculture before this committee, that the \$350,000 appropriated for this year has been well spent; that it has paid its way; and that it has been a wise appropriation on the part of Congress.

We believe, and we are sincerely convinced of this fact, that any decrease in the appropriation will mean, by the showing made by Doctor Coons, that much of the money which has been expended heretofore will be wasted. The increase in the number of barberries is such that the problem must be vigorously attacked and rapidly attacked if the barberries are not going to get away from us altogether.

We have shown that the States are ready to cooperate and that they are going to make adequate appropriations for cooperation with the Federal Government.

We have shown also that this is certainly the time to wind up this job and wind it up in good shape, by reason of the fact that a great body of popular sentiment has been built up and that the people themselves are prepared to cooperate aside from State appropriations. We can not tell, of course, how many barberries have actually been removed by virtue of the stimulus of our publicity campaign, but I venture to say that the number that has come out and will continue to come out has been increased tremendously by reason of that publicity.

We have shown also that the end of the campaign is in sight. I made the statement a short time ago that about two years or more of Federal assistance would finish the job, as far as the Federal Government is concerned. Mr. Reed, Mr. Hill, and Mr. Hunt have stated that for Minnesota, North Dakota, and Iowa one more year of Federal cooperation will probably do the job.

In other words, the opportunity is presented for the Federal Government to finish something it has already undertaken and to hang up for itself a completed job which has for its object the preservation of the food supply of the United States, in which we play so important a part.

I should like very much to supply the members of the committee with any detailed information they may desire, but unless there is a request for it here, I will prepare it and send it around to the various members.

If there are no other questions, we thank you for this hearing.

Mr. ANDERSON. We are much obliged to you for your statements.

FRIDAY, NOVEMBER 17, 1922.

FOREST SERVICE.

STATEMENT OF COL. W. B. GREELEY, FORESTER IN CHIEF.

AREA OF NATIONAL FORESTS—RECEIPTS FROM SALE OF TIMBER AND GRAZING FEES.

Mr. ANDERSON. Colonel, do you want to make a preliminary statement before we take up the statutory roll?

Colonel GREELEY. I would like to, Mr. Anderson.

Mr. ANDERSON. All right, sir.

Colonel GREELEY. I believe it desirable to give the committee a general picture of the situation on the national forests which absorb the bulk of our expenditures.

During the past fiscal year the area of the national forests was increased by 171,000 acres and now reaches a total very close to 157,000,000 acres. That increase has come about chiefly through the purchase of lands in the Eastern States under the Weeks law.

The receipts from the national forests in the past year reached the highest figure during their administration, or a total of \$5,068,000. A portion of these receipts should be credited to business handled during the preceding year; that is, the grazing business for which payments were deferred by act of Congress. On the other hand, certain grazing receipts that would normally be paid during the fiscal year just closed were postponed by authority of the Secretary of Agriculture until the next fiscal year, so that the grazing receipts partially balance. The total receipts of over \$5,000,000 represent in an approximate way the growing of the national forests.

I want to call attention to the fact that the receipts have now reached a point where they nearly offset the expenditures for protection and administration. Those expenditures amounted last year to \$5,127,000 as compared with receipts of \$5,068,000. We are gradually closing the gap. These figures do not include the emergency expenditures for fire fighting but are based upon the normal cost of maintaining the protective organization and handling the use of resources.

SALE OF TIMBER.

The timber business on the national forests last year showed in receipts and cut substantially the same volume as during the preceding fiscal year. The cut was a little over 800,000,000 board feet, and the receipts from sales of timber \$1,828,000. The receipts during the year reflected the ups and downs in the lumber markets of the country and beginning last spring showed a very rapid increase.

We made during the year 13,687 timber sales with a total of 2,100,000,000 board feet. This is the largest year's timber business we have yet had. It represents an income of a little over \$6,000,000 which will be realized mainly within the next 10 years. Many of these sale contracts extend over periods of several years.

During the last six months the sales business has increased at a very rapid rate. The cut during the last three months—July, August, and September—reached nearly 600,000,000 board feet

and is by far the heaviest we have had in any quarter. The receipts during that three months period reached \$840,000, exceeding by over 30 per cent the business in any previous quarter. These facts indicate the general situation in the lumber business, with the sawmills of the country moving westward. Particularly are they now moving westward from the southern pine States. As the number of them seeking western locations increases, the national forest timber is coming more and more into demand.

We are gradually converting this national reservoir of undeveloped timber into operating areas with a cut of stumpage that under normal business conditions can be expected to increase 20 to 25 per cent a year until the limits are reached which must not be exceeded in order to make the yield of timber permanent. From the closest study we can make of the situation, our timber cut during this current year will be about 1,000,000,000 feet, representing an increase of 25 per cent over the former year and an income of something over \$3,000,000. Thereafter prophesying is rather uncertain because the lumber business of the West has been subject to so many ups and downs. But the cut of timber in the Western States is bound to increase very rapidly. I learn from my friends in the South that every year from 30 to 40 mills in the southern pine territory are cut out and dismantled. Their work is done and the capital released by these southern operations is in large measure looking for new western locations. We have applications and inquiries for national forest timber that run into enormous figures, many of them purely tentative, many of them more or less speculative. But there are three or four billion feet in outstanding applications to-day that represent new business, which will probably be consummated within the next one or two years.

INCREASED DEMAND UPON SERVICE.

Putting everything together we face the certainty of a rapid increase in the demands upon this service for handling the disposal of national forest timber. I am somewhat concerned over our ability to take care of this increased business, not as to numbers of men, but fully as much as to the quality and experience of our men. We may be compelled before another year is out to reject applications until we have gotten an organization that can handle this business effectively and get the results needed in reforestation in the condition in which the ground is left for future timber growth.

GRAZING PERMITS.

The grazing business has remained very stable. We grazed last year about 9,000,000 head of sheep and cattle, representing an income of about \$2,200,000, and the herds of 37,241 grazing permittees. The grazing industry of the West has been through a serious slump financially, which has imposed many difficulties upon the Forest Service. We have had many requests for deferred payments of grazing fees. Many old users of our ranges who were manifestly unable to raise any further money on their business or meet their obligations to the Government were involved.

We have tried to meet this situation in a human way and recognize the acute conditions in the industry. Our deferred payments for the grazing year of 1921 have all been cleaned up with the exception of \$78,000, out of a business of \$2,400,000; and a portion of that will be recoverable without legal action. The receipts for the present grazing season will probably all be paid by the time limits set, with the exception of a very small percentage, and the great bulk of that can be recovered without the necessity of legal action, because the grazing industry of the West is gradually getting back on its feet.

Our great problem in the handling of the grazing business is the intensity of the demand for national forest range, arising largely from the extent to which the old open public range has been taken up by settlement and the fact that the absence of any regulation of the open public ranges still remaining has resulted in their very serious deterioration at many points. That is forcing a good many stockmen to seek new range and it tends to crowd sheep and cattle on the national forests and make the administration of our grazing more difficult.

I am going to speak of that again in connection with the specific item of range improvement because it is a very practical question we have to meet.

LAND PERMITS.

I want to refer briefly to the land business, something that has not been mentioned very often in these hearings. We have outstanding nearly 27,000 permits for the use of lands in the national forests. They cover almost every conceivable variety of land use. There are many industrial establishments, sawmills and mercantile institutions, fish canning plants in Alaska, and that sort of thing, down to summer homes and small pastures used in connection with grazing permits.

This demand for the use of the national forests in varied ways is increasing very rapidly, particularly in connection with recreation. We issued last year some 1,500 more permits than at any time previously, arising largely from the demand of the people as they go into the national forests seeking recreation for permits to use small bits of land for permanent summer homes. It is a wholesome use and I think a use that should be encouraged.

PROTECTION AGAINST FOREST FIRES.

The fire situation during the past season has been what I would call normal or average. The large fires reported from the Western States during the summer and from Minnesota during the fall were not on the national forests, although the national forests shared in the general hazard to a considerable extent. In fact, the national forests have fared very well this past summer considering the extent of the losses in the regions around them. That is partly because of our organization and partly because, as our lands lie usually at a higher elevation, they fare better in the periods of summer drought than the lands lower down and around them.

We now have between 5,800 and 6,000 fires each season. During the past two seasons these have burned over about 370,000 acres each year, or about two-tenths of 1 per cent of the area of the national forests. I am not satisfied with this showing, as I have set the goal

as the reduction of our annual loss to one-tenth of 1 per cent of the area under protection, before we can regard our fire hazard as under control. The damage during the past two years has been comparatively small. It was about \$212,000 last year and about \$322,000 in the summer of 1922.

The feature of our fire protection that disturbs me most is our emergency expenditures and the fact that we are still on a deficiency basis in meeting these emergencies. In the summer of 1921 we had to spend \$536,000 in emergency expenditures for fire fighting and we had to go to Congress for a deficiency appropriation. During the summer just closed we had to expend \$539,000 for emergency fire fighting and must again go to the Committee on Appropriations for a deficiency. As nearly as my own judgment is able to size up the situation, these two summers are what we must expect as a regular thing, and if we fare better than that in any particular year it will be because of exceptionally favorable climatic conditions. As far as the organization of the Forest Service goes, we have got to take the 1921 and the 1922 seasons as normal. That means that we must still remain far too largely upon the emergency basis in handling our fire suppression.

Last year we got 78 per cent of the fires and this year 80 per cent of the fires when they were still one-man size, i. e., when the patrolman got there soon enough to put the fire out unaided. But the 20 or 22 per cent of the fires that got away because they were too big when the patrolman got there, which means in the majority of cases that we have too few patrolmen, caused these excessive expenditures.

It is impossible to expect the Forest Service to keep down the number of fires without large emergency expenditures unless we can put a more intensive patrol on all the forests. The emergency expenditures can not be wholly eliminated but they can be greatly reduced by a more adequate protective organization. I want the committee to understand the situation which still confronts us in this respect and which forces us to return to Congress year after year for deficiency appropriations. That does affect one of the changes in the statutory roll and I will speak of it when I come to it.

SALARIES.

On the statutory roll 29 places have been dropped altogether and three other clerical positions transferred to the Civil Service Commission, making a net reduction in the statutory roll as compared with the current year of \$21,720. On the other hand, we have transferred to the statutory roll from various miscellaneous rolls 19 clerical positions. In every case, creating a net reduction in the lump sum concerned except in one item where a special increase has been recommended. Those 19 positions represent an addition of \$27,700 to the statutory roll, leaving a net increase in the roll itself of \$5,980. Comparing the appropriations as a whole and considering the reductions in the miscellaneous items, we have cut the total estimate \$21,720, by the 32 positions dropped from the roll or transferred to the Civil Service Commission.

TRANSFER OF RANGERS TO LUMP-SUM STATUTORY ROLL.

There are no changes in the individual items, no promotions or any other changes involved except the new language which we ask to have inserted on page 135. The statutory roll has previously included 590 rangers, at \$1,220 each. These men have all been employed for the year-long period and have been employed effectively. But in endeavoring to meet the situation which I outlined in connection with the increased cut of timber and also to eke out a little more leeway to meet the summer fire situation, I finally secured the Director of the Budget's indorsement on this language, which substitutes a lump sum of \$200,080 in lieu of 164 of these ranger positions. It provides that these places shall be carried as forest rangers, guards, or scalers at the rate of \$1,220 per annum for periods of 12 months or less. The rate of compensation is fixed but leeway is given as to period of employment.

These 164 rangers heretofore have been employed as assistants on our ranger districts. We have, all told, about 900 permanent ranger districts, each in charge of a responsible man for the year round. On the bulk of these districts the one ranger must handle the work the entire year with additional guards or patrolmen only during the summer season. But on certain of the busiest districts which have heavy improvement or sales work we have been furnished assistant rangers to the extent of 164 men. Some of these assistant rangers will still have to be employed the year round; but in view of the urgency of the additional timber work I would like very much to have leeway to reduce the employment of some of these men to 10 months, 8 months, or possibly 6 months and use the money saved for an additional scaler or fire guard during the peak season's work; that is, during the summer when everything is going full blast, fire protection, grazing, timber, and everything else.

What this language means is that by exercising economy we may be able to save eight or ten thousand dollars on the services of men who have hitherto been employed the year round and use that amount to reinforce the temporary men employed during the summer season. That will have to be chiefly to provide scalers to handle the increased cut of timber.

Mr. ANDERSON. You would not get much for \$8,000 or \$10,000.

Colonel GREELEY. \$10,000 might provide 20 additional scalers during the logging season. This is the only leeway we have got under these estimates. The Director of the Budget did not find it possible to allow the additional men I asked for in order to take care of the timber business directly, and this is the only means of meeting the situation. It will enable us to employ a few more men where most needed during the busiest season.

MARKING OF FIRE FIGHTERS' GRAVES.

There is come new language on page 140. That is the first new language we come to after the item I just discussed. It authorizes the Secretary to use not to exceed \$500 of the funds appropriated for marking the graves of fire fighters who lost their lives in the 1910 forest fires and are now buried at St. Maries, Idaho, and also for caring for the graves of another group of men now buried in the cemetery at Wallace, Idaho.

Mr. ANDERSON. How many of those are there?

Colonel GREELEY. About 20 at Wallace and about 50 in the cemetery at St. Maries. A provision in the appropriation act for 1921 authorized the use of \$500 to mark the graves at Wallace and that was done. We have subsequently found that the graves of these fire fighters at St. Maries, Idaho, have been unmarked, and it seems appropriate to use a small amount of money to improve the appearance of the graves and to give them some suitable marking in commemoration of the fact that these men lost their lives in the public service in protecting the national forests in that region. That is the purpose of this item.

Mr. BUCHANAN. That may be legislation, but I am in favor of it.

FIGHTING AND PREVENTING FOREST FIRES.

Colonel GREELEY. We have also asked for new language in the item on page 146, for fighting and preventing forest fires. No change is proposed in the amount of this item, although it has been proven inadequate by the experience of a good many years. It requires us to operate on a deficiency basis, but the committee which handles the deficiency appropriations has understood our situation very fully and has given us sympathetic support.

We are asking for authority here to expend not exceeding \$25,000 of the amount appropriated for meeting emergencies arising from attacks of timber-killing insects. Down to 1920, the language of this item authorized the use of the money for "other unforeseen emergencies" as well as for fighting fires. In the bill for the fiscal year of 1921 the "other unforeseen emergencies" disappeared, and I have been unable to recall, Mr. Chairman, just why that particular language was dropped out.

TIMBER-KILLING INSECT INVESTIGATIONS.

The situation is this: We do not conduct any technical work on forest insects, as that is done for us by the Bureau of Entomology. But from time to time we have these outbreaks of timber-destroying insects, particularly the pine-bark beetles, which often assume very serious proportions. For example, in southern Oregon a serious outbreak of this pest occurred last year, the beetles operating both on private land and forest reserve land and to some extent on Indian reservations. The situation was such that the State of Oregon passed a law compelling private owners to clean up their holdings under certain conditions, and Congress passed a special deficiency of \$150,000 to enable the Secretary of Agriculture and the Secretary of the Interior to clean up the Government holdings.

That particular situation has been provided for, but we have three other points to-day where the pine beetle is liable to become dangerous. One of them is on the Kaibab Plateau, on land which lies partly in the Grand Canyon National Park and partly in the Kaibab National Forest. The Forest Service and the National Parks Service put their odds and ends of appropriations together last year and succeeded in getting \$2,500 available for attacking that outbreak before it reached large proportions. We will have to do some clean-up work there next spring. Those outbreaks occur at one point or another nearly

every year and the situation is exactly analagous to forest fires. Ordinarily if these insects can be cleaned up promptly serious damage is prevented, but if they run on and reach what the entomologists call an epidemic stage, where the swarms multiply at an enormous rate, the damage may run up into figures that equal the damage from forest fires. We have had that happen. It happened in the Black Hills about 1900. It would have happened in Oregon had not provision been made for suppressive measures. So we would like to get authority to use \$25,000 out of this forest fire fighting fund for such emergencies.

Mr. ANDERSON. This \$25,000 I suppose would be used for the physical work of suppressing the outbreak and not for technical investigation?

Colonel GREELEY. No; it would be used entirely for employing labor to cut down infested trees and to carry out the physical labor of control as experts from the Bureau of Entomology direct it. They always examine these areas and tell us just what to do. In fact, they usually furnish a man to direct the work of suppression.

Mr. ANDERSON. I do not want to build up in the Forest Service another Bureau of Entomology. I can easily see that in a work of these enormous proportions there is a certain amount of physical work that is done by private owners when owned by private parties and the Forest Service must do the same thing.

FOR SELECTION, ETC., OF LANDS WITHIN BOUNDARIES OF NATIONAL FORESTS.

Colonel GREELEY. The item on page 148, the selection, classification, and segregation of lands within the boundaries of national forests that may be opened to homestead settlement and entry under the homestead laws applicable to the national forests, etc., remains the same. Just a word of explanation may be in point. The original purpose of this item has to a considerable extent been accomplished. That was the classification of the lands in the national forests which have agricultural value and their segregation under the forest homestead law, so that they may be entered by settlers. We have classified to date approximately 143,000,000 acres out of 157,000,000 acres in the national forests and have opened to homestead entry in excess of 3,000,000 acres as a result of this intensive classification. We still have certain areas in Alaska which must be classified and we have a certain amount of work to do in investigating appeals or correcting the original classification where there appears to be reason for reexamination.

This item also covers the cost of making surveys by metes and bounds in order to permit settlers in the national forests on lands which have not yet been covered by the rectangular surveys of the General Land Office to offer proof and get patents. We have from 100 to 200 cases of that character each year and they cost us about \$200 per case. That is a requirement that will continue probably for another five or six years, and then it will gradually disappear with the completion of the entries made upon these lands. On the other hand, the work of handling exchanges which is provided for in this item is one that is going to grow into large proportions. Last March

Congress passed a general exchange law, which authorized the Secretaries of the two departments, Agriculture and Interior, to exchange national forest lands and timber or national forest timber alone for an equivalent value of privately owned land within the boundaries of the national forests. Over 25,000,000 acres of private land within the exterior boundaries of the national forests are available for exchange under that law, assuming the exchange to be desirable. We are developing that work very slowly because we do not wish to start any exaggerated ideas on the part of owners of timber lands in the national forests that these exchanges are going to be made hastily or solely for the purpose of enabling a lumber company to consolidate its holdings. Furthermore, we are insisting on establishing a very conservative basis of valuation. But the exchange work is almost certain to grow to large proportions and necessitate increased future appropriations under this item. For the coming year we can handle the work we have with this fund.

CONSTRUCTION OF SANITARY FACILITIES AND FOR FIRE-PREVENTIVE MEASURES ON PUBLIC CAMP GROUNDS.

In the item on page 150 for sanitary facilities and fire-preventive measures on public camp grounds an increase of \$5,000 is proposed. This money is spent exclusively in constructing latrines, garbage pits, and simple water-supply facilities and for cleaning up inflammable debris on the areas in the national forests which are used by large numbers of people for camping. The appropriation that the committee gave us last year of \$10,000 to initiate this work was a god-send and enabled us to take care of some situations which had become not only a menace to public health but a serious affront to public decency. The amount of such work needed is difficult to estimate exactly. We have, according to the reports of the district foresters, between 900 and 1,000 camp grounds which are used so generally that it is necessary to install fire-protection facilities and sanitary conveniences. Wherever possible we are making cooperative arrangements with local communities, chambers of commerce, and local associations of one kind and another that are interested in the use of these areas for camping, under which they assume the cost of constructing the toilets and other facilities needed. We are getting a considerable number of areas provided for in that way. There remains a large number on which there apparently is no way to give the public health reasonable protection and at the same time avoid the danger of a serious fire hazard without the work being done by the Forest Service itself. The cost of what we do on the average camp ground amounts to \$130 or \$140, which limits improvements to the construction of usually two or three very simple pit toilets, a garbage pit of some kind, cleaning up inflammable debris, and throwing up a few rough stone fireplaces to confine the camp fires and reduce the hazard of their escaping.

The increase of \$5,000 will enable us to take care of a few more of these intensively used camp grounds and is very greatly needed.

FOR PURCHASE AND MAINTENANCE OF FIELD OFFICE AND LABORATORY SUPPLIES, ETC.

There is no change in the item for supplies on page 151. That fund is completely used in the purchase of fire-fighting equipment, needed office equipment, and administrative equipment like compasses, scale sticks, and the like. We have to supplement it to some extent by buying similar supplies and equipment from other lump-sum items.

INVESTIGATION OF METHODS OF WOOD DISTILLATION, ETC.

A net increase of \$15,000 is provided in the next item, for investigation of forest products, on page 152. The actual increase indicated in the item itself is \$10,800, but it is proposed to transfer three clerical positions previously paid out of this fund to the statutory roll so that the net increase available for this work will be \$15,000.

I take it that it is unnecessary to go over the general scope and character of these investigations. The increase is asked with three specific purposes in view. The first is to enable the Forest Products Laboratory at Madison to carry through the technical work which we have been asked to do by a central committee representing lumber manufacturers and users which the Secretary of Commerce has been instrumental in having established, for the standardization of lumber grades and specifications including nomenclature, dimensions, and grade specifications. The Forest Products Laboratory has done a great deal of work bearing on this subject for a good many years.

As an example, on the basis of our mechanical tests of timber, the laboratory was able to work out a method of grading structural timbers of southern pine in which the grade reflects the actual strength and structural value of the timber. It is the so-called "density rule," based upon the number of rings and the proportion of heavy "summer" wood which gives the timber strength.

The Departments of Commerce and Agriculture are now endeavoring to develop more uniform and effective system of grading all kinds of lumber. A committee of manufacturers and consumers is covering the whole field—factory lumber, yard lumber, heavy structural timbers, hardwood lumber that goes into furniture and other forms of remanufactures, etc. The Forest Products Laboratory has been designated as the agency to get the technical data. It is a very large order and represents probably a two or three years' job. The project is a very important one and we expect to use at least one-half of the \$15,000 increase for that purpose.

The other developments that we have particularly in mind in connection with this increase are a study of wastes in the manufacture of paper and a study of improving methods of finishing wood with paints and varnishes. The paper manufacturers of the country who use chemical processes for converting wood into pulp, like sulphite pulp from which newsprint is made and soda pulp from which book paper is made, have been unable to avoid a loss of from 10 to 20 per cent of the raw material. They know that so many tons of pulp wood go into their digesters and that so many tons of chemical pulp come

out. There is a loss even at efficient plants which will often run from 10 to 20 per cent. There is also a loss of chemicals that now go off with the waste effluents but theoretically ought to be recoverable for further use. No one has really been able to get to the bottom of this problem, and the commercial interests particularly concerned in it are anxious to have the Forests Products Laboratory cooperate with them in a joint attack. They propose to furnish a considerable amount of money to help, and we would like to have \$4,000 or \$5,000 to finance the Government's end of this work. It is a very practical matter of conservation because if these losses can be prevented it should mean a corresponding reduction in the current drain upon our timber.

I want to speak in this connection of the extent to which investigations of this character ought to be paid for by the Government and the extent to which they ought to be paid for by the commercial interests which will benefit from them. We have been developing commercial cooperation at the Forest Products Laboratory pretty rapidly during the past two or three years, on the general principle that as far as possible the industry or the group of men who are going to get particular benefit from a Government investigation ought to pay the major portion of its cost. We now get contributions on that basis from commercial concerns amounting to between \$40,000 and \$50,000 a year, which goes into tests of boxes, special tests of paper-making processes, experiments with new methods of preserving timber, courses of instruction in lumber seasoning, etc., in which a particular industry or group of men have special interest. We are developing the idea that the wood-using industries should, to a reasonable extent, pay their way on investigations at the laboratory which are of distinct and immediate benefit to them.

We have gone into these two problems, the wood finishes and study of paper wastes, on that basis. What is required is that certain fundamental and technical investigations in the chemistry of wood cellulose and in wood physics be carried out at the Forest Products Laboratory. For that the use of Government funds is reasonable, because it is fundamental work having many scientific and industrial bearings and possible applications. Other phases of these studies on the side of commercial practice, manufacturing conditions, etc., ought to be financed by the industries immediately benefited.

That is all I have to say on this item unless the committee would like to see some exhibits. Here is a sheet of paper made entirely out of cotton linters, a process developed by the laboratory. It makes a pretty high grade of book paper. Here is a sheet made out of oat hulls, the waste in the manufacture of oatmeal. The tests on paper manufacture from flax straw are going along well. We expect to have that pretty well worked out within another year.

We recently produced a very good paper at the laboratory by deinking old newspapers under a new process which promises to be profitable commercially and effect an enormous saving of raw material.

SATURDAY, NOVEMBER 18, 1922.

RANGE INVESTIGATIONS.

Mr. ANDERSON. Colonel Greeley, we will take up this morning the item on page 155, for experiments and investigations of range conditions within the national forests or elsewhere.

Colonel GREELEY. This is the fund under which the Forest Service maintains its special grazing studies at the Great Basin Experiment Station in Utah and its studies in the practical handling of cattle ranges in Arizona and New Mexico, where the handling of cattle under improved methods of rotation grazing and other improvements in range management is being worked out. The real purpose of this series of studies is to develop the scientific side of the use of the open range lands of the West, to put the grazing industry upon a more stable basis, and at the same time trying to get better results in keeping up the productivity of our range lands. A concrete illustration of what this means, something I had a chance to check up personally last summer, is working out of a system of rotation grazing on the individual sheep or cattle allotments. This means that the principal forage plants of the allotment must be determined, their seeding period and other reproduction habits established, and a distribution of the cattle or sheep worked out under which each portion of that allotment will have an opportunity, every three or four years, to fully re-seed with the more valuable native plants. As a result of these scientific studies this system of deferred and rotation grazing, as it is called, is now in effect on a considerable number of the range allotments in portions of Utah and other States, where the grazing conditions are most serious and the demand for the use of the range is most intense.

Another practical result of these investigations has been working out the proper season for grazing the ranges of different types and at different elevations, determining the time of the year when the forage can be grazed without serious injury. We found, for example, that a postponement of grazing of only two weeks at the beginning of the season may have a very marked effect upon the net returns from the range and its sustained productivity, because of the better opportunity given the forage to establish itself. It has also been possible through these investigations to establish for many of our range types the changes in plants or forage types which indicate deterioration of the range. That has been well worked out on a number of the ranges in Utah where results show that as a range deteriorates from excessive use the character of the plants changes; that the more nutritious wheat grasses, for example, give way to certain classes of weeds, and that as excessive grazing continues these classes of weeds give way to more inferior weeds, until finally the carrying capacity of the range may be reduced to one-third or one-fourth of what it was when in good condition. These indicator plants give the forest supervisor and forest ranger a ready means of checking up on the condition of their ranges and ascertaining where overgrazing is showing up. These grazing investigations are exceedingly constructive in character, particularly as they are producing many things that the livestock industries of the West use on their private ranges, in methods of herding and salting, and that sort of thing, as well as results which are directly used for the betterment of the Govern- ges.

Mr. BUCHANAN. The items call for experiments and investigations and I presume that is all that is done, is it not?

Colonel GREELEY. There are several different methods of conducting experiments. One is the establishment of sample plots—small range areas perhaps as big as this room, perhaps as large as a quarter section. These are placed under fence, and the actual conditions of that range and of its use are carefully checked and studied from year to year in order to determine the progress of the range upward or downward and why the changes are taking place.

Mr. BUCHANAN. You would not need to make much of an investigation as to the weeds, would you, because the cattle would eat all the good grass and would not eat the bad weeds, so that you would not have to have any study made of them.

Colonel GREELEY. The question there is to determine at what point proper use of the range gives way to excessive use.

Mr. BUCHANAN. That is determined by experience alone, is it not?

Colonel GREELEY. Of course, any class of stock will eat the most palatable forage first. The question we are after is a real change in the character of the range as the result of overgrazing—something which has actually happened on a good many of those western areas.

Mr. BUCHANAN. Do you think the need for this appropriation will ever cease?

Colonel GREELEY. I doubt it.

Mr. BUCHANAN. Then it is like the brook, it will go on forever?

Colonel GREELEY. The proposition is so big, Mr. Buchanan, that it will probably go on for a long time. It affects 125,000,000 acres of range lands in the national forests; it really affects over 80,000,000 acres of public range lands outside the national forests, and its results are being used by a great many stock men on their own lands. That being so, I think we have got to anticipate continuing for a great many years what we are doing here. While we have our own land immediately in view, we are doing for the range business of the West the same sort of thing that Doctor Taylor's work is doing for agriculture and that Doctor Mohler's work is doing for the intensive live-stock industry.

Mr. ANDERSON. We will next take up the item on page 156, for the purchase of tree seed, cones, and nursery stock, etc.

FOR PURCHASE OF TREE SEED, ETC., FOR SEEDING AND PLANTING.

Colonel GREELEY. The next item covers tree planting. There is no change in the amount and no change is proposed in the general character of the work. We have about 1,500,000 acres of land in the national forests which have been denuded by old fires and which, as far as our present experience goes, will have to be planted in order to be restored to timber growth. With this appropriation we were able in the past year to plant approximately 9,000 acres and to maintain the eight forest nurseries. These nurseries have an annual producing capacity of between six and eight million forest seedlings.

Mr. ANDERSON. What do you do with that many seedlings?

Colonel GREELEY. We use them all; we use about 8,000,000 seedlings a year normally.

Mr. Buchanan. Eight millions?

Colonel GREELEY. About 8,000,000. You see, we plant from 800 to 1,200 seedlings per acre, and we have to allow some surplus for possible losses. I should say, Mr. Chairman, that small amounts of seedlings from one of the nurseries in Nebraska are distributed to settlers under special legislation, but the great bulk of them are used on Government lands.

Mr. BUCHANAN. You say you set out 9,000 acres?

Colonel GREELEY. Yes, sir.

Mr. BUCHANAN. And it costs you about \$18 an acre to set them out?

Colonel GREELEY. Well, it would be 9,000 into \$125,000.

Mr. BUCHANAN. Not quite \$18.

Colonel GREELEY. It would be about \$14.

Mr. BUCHANAN. Yes; that is about right.

Colonel GREELEY. That includes all the overhead costs, of course, and some experimental work that is done with this fund where the best methods have not yet been worked out. We are doing some planting, Mr. Buchanan, for \$5 an acre in the sandy lands of Michigan. In the Minnesota National Forest we have planted about 6,000 acres with white and Norway pine, at an average cost of \$10 an acre.

Mr. BUCHANAN. If it should cost more than that, I think it would be justified, and I am more impressed with this item than I was with the previous item.

Colonel GREELEY. We have planted to date about 100,000 acres in the national forests successfully. This appropriation enables us to drive away at the most urgent points but without making very rapid progress on the big area that ultimately we must expect to reforest by this means. Some day I expect to come before this committee with a planting budget and ask for approval by Congress of a program under which these denuded lands in the national forests can be planted within 20 or 25 years. For the present we are proposing simply to continue the work on a limited scale.

Mr. ANDERSON. Are the States doing any planting?

Colonel GREELEY. Yes, sir; a number of the States have gone into planting quite extensively. Pennsylvania, New York, and Michigan are doing a good deal of planting on their State forests. Several of the States, particularly Massachusetts, and also New York and Pennsylvania, are furnishing planting stock at cost to land owners within their States, who will agree to plant their lands and take good care of the plantations. Several of the prairie States, like Iowa, Nebraska, and Illinois, are doing a good deal of work in experimental plantations, working out the species and methods adapted to their soil and climatic conditions. All told the amount of planting done with State aid or under State auspices probably amounts to 20,000,000 or 25,000,000 trees a year and is increasing pretty steadily.

Mr. ANDERSON. Is any planting being done by private cut-over land owners?

Colonel GREELEY. To some extent and to an increasing extent from year to year. There are several paper manufacturers in the Northeast who have started the policy of planting their cut-over lands, and one of them maintains its own nurseries. I imagine that several thousand acres are planted every year by private companies in northern Maine, New Hampshire, Vermont, and New York. Last

summer I visited a commercial nursery at Keene, N. H., in the center of the New England white-pine belt, which finds a sale for from 3,000,000 to 4,000,000 young pine trees every year, and they are mostly purchased and planted by commercial concerns. Farther west you find less and less of that, but the interest is increasing. The committee may be interested in learning that within this past year several of the large redwood manufacturers in California have become convinced that the planting of their cut-over lands is a practicable and profitable commercial undertaking. They are starting a planting program on a large scale. That is all I have to say about this item.

SILVICULTURAL, DENDROLOGICAL, AND OTHER EXPERIMENTS AND INVESTIGATIONS.

Mr. ANDERSON. The next item is on page 158, for silvicultural, dendrological, and other experiments and investigations, etc.

Colonel GREELEY. There is no change in that item. That is the item under which the forest experiment stations are maintained and the investigations in tree growing conducted. We now have six small forest experiment stations in the South and West which are working out the problems of reforestation in their several regions. Some of these stations have been in effect long enough to produce very definite and tangible results; but others have not. The latter are producing reports on particular experiments but have not as yet worked out the forestry science of their region.

In the Northwest, for example, the stations in Washington and Idaho have worked out practical reforestation methods adapted to those regions, and the results obtained by those two stations are to-day the principal basis for State legislation and for the impetus given to forestry by timber associations and private concerns. They have had a very valuable part in directing the forestry development of those regions.

Mr. BUCHANAN. If they have completed their work what is the necessity for their continuation?

Colonel GREELEY. I feel there is a necessity for their continuation, Mr. Buchanan, because there are still many questions that we ought to answer before we can call the job finished. Europe has experiment stations that have been in existence for 100 years.

Mr. BUCHANAN. You say they have been in existence in this country that long?

Colonel GREELEY. No; I said Europe has forestry experiment stations that have been in existence for 100 years, and I think we have got to expect that most of these stations, not necessarily all of them, must be maintained for a long period of time to get the cumulative results in scientific observations that we need to develop our forestry science.

Mr. BUCHANAN. You have six in the United States and two of them are in the Northwest. If they have reasonably accomplished the purpose for which they were established, it looks to me as though you should move them to other sections and let them study the climatic conditions there, and other things, instead of letting them stay there, if they have worked out the problems connected with that section. Have they not worked out the major problems of that region?

Colonel GREELEY. They have worked out the problems which were of special urgency in those regions in order to get things started in the growing of timber, but there is still a whole lot of work that needs to be done on the rate of growth, the yield to be expected from second-growth stands, and the best way to produce timber of different species and different qualities. I think it would be a mistake to abandon those stations for a long time to come. At the same time, there are other regions where we need to be doing the preliminary work.

LOCATION OF EXPERIMENT STATIONS.

Mr. BUCHANAN. What station do you have which is nearest Texas?

Colonel GREELEY. We have a station which covers the southern Pine Belt with headquarters at New Orleans.

Mr. BUCHANAN. You do not have a station in New Orleans?

Colonel GREELEY. No; just the headquarters. The field work is done and most of the men are stationed at points in the forests of Louisiana; one of them is in Florida; and one, I think, in Georgia.

Mr. BUCHANAN. What constitutes the personnel of one of these stations?

Colonel GREELEY. One of these stations should normally have six technical men.

Mr. BUCHANAN. That is, including the overhead?

Colonel GREELEY. Including the director and his assistants. There should also be probably two clerks.

Mr. BUCHANAN. Two clerks and three field men?

Colonel GREELEY. Two clerks to six field men.

Mr. BUCHANAN. And one director, making nine?

Colonel GREELEY. That would be eight; the director, five assistants and two clerks, you might say, represent the normal organization. At the present time we have been able to give this southern station four men and one clerk; we would like to change the staff to six and extend the scope of their investigations. They should cover the whole southern Pine Belt. We have another station in the Appalachian hardwood region, with headquarters at Asheville, N. C.

Mr. BUCHANAN. Have you published bulletins?

Colonel GREELEY. It has published some short bulletins. Both of those stations have only been in existence one year.

Mr. BUCHANAN. Has the other one published bulletins?

Colonel GREELEY. The western stations have published a good many bulletins. For example, we have one station in the Southwest which has published a number of bulletins; and now we have in the Government Printing Office a bulletin which covers all phases of its 10 years of work on the reforestation of the western yellow-pine region. It is an extremely valuable contribution to American forestry literature.

Mr. ANDERSON. There have been several bills introduced, Colonel Greeley, providing for the establishment of a forest experimental station in the Great Lakes region. Can you tell us anything about the necessity or desirability of a station in that region?

Colonel GREELEY. I regard the Great Lakes region as one of the most urgent places for the establishment of a forest experiment station because of the fact that it contains about 60,000,000 acres

of forest land, the greater part of which will probably always be forest land. It now has over 40,000,000 acres of cut-over land, a great deal of which has been seriously denuded and is practically unproductive. Everyone in the Great Lakes region who is in touch with their land problem now recognizes the necessity for intensive development of the right use of their forest lands which are nonagricultural in character. I was called upon to address a meeting of the Tri-State Development League last winter, which represents primarily the agricultural interests and the agricultural boosters of Michigan, Wisconsin, and Minnesota. While the point of view of that meeting was primarily for agricultural development, it was plain that the leaders had come to realize that with their agricultural development they must have intelligent use of the forest lands, which form 40 per cent of their land area, in order to maintain the economic welfare of those States.

The State of Michigan, recognizing the same thing, has instituted an intensive soil and economic survey of the northern half of the State in an endeavor to get the basic facts as to the quality of those lands and what they should be used for. Michigan has awakened to the fact that in the northern counties she lost 10,250 farms during the last decennial period; parts of Minnesota actually lost in farm population during the same 10 years. This goes to show that the economics of the land situation in the Lake States demand intensive forestry along with intensive agriculture. With that enormous forest land area, largely unused, coupled with the fact that the Lake States are strategically located to supply the whole central part of the country with forest products, an intensive study of their forestry problems would be very well worth while. In fact, I think that a forest experiment station is more needed now in the Lake States than in any other region, with perhaps New England coming second.

Mr. BUCHANAN. Have you no power under this legislation to establish one there?

Colonel GREELEY. We can as far as the language of the appropriation is concerned.

Mr. ANDERSON. All you need is the money?

Colonel GREELEY. Yes, sir.

Mr. BUCHANAN. You are not limited to Government land?

Colonel GREELEY. No, sir. Is that all on this item?

Mr. ANDERSON. That is all. We will take up the next item on page 160, for estimating and appraising timber and other resources on the national forests.

FOR ESTIMATING AND APPRAISING TIMBER AND OTHER RESOURCES ON THE NATIONAL FORESTS.

Colonel GREELEY. There is no change in the item or the amount. This fund of \$100,000 is divided between the surveying and appraisal of timber in preparation for sale and the surveying of grazing lands where we need an intensive data on the forage resources of a particular national forest. We are making fair progress in our timber surveys. We have about 80,000,000 acres of merchantable timber in the national forests and about one-fourth of that has been covered to date. Under this item we are able to extend this work at the rate of 400,000 or 500,000 acres a year, and it is only needed in the region

where there is an active demand for timber. In many of our large forest areas which are inaccessible and shut off by topography, lumber development is still a long way in the future and no expenditure of this character would be justified.

We have applications for stumpage at the present time, many of them serious, some of them purely tentative, and some doubtless speculative, up to a total of some 9,000,000,000 feet. A part of these applications cover areas which have been surveyed in previous years. Approximately 7,000,000,000 out of the 9,000,000,000 feet, however, represent areas that will have to be surveyed and mapped before we are in a position to fix the price intelligently and make a sale. The survey of this 7,000,000,000 feet in itself would cost more than the entire item for a single year. It will be necessary to select out of these timber applications those which are the most promising and where a sale would be most desirable from the standpoint of the condition of the timber and confine our surveys to those particular applications. We can not at the present time keep up with the volume of applications for Government timber, but we can take care of the most urgent ones.

Mr. BUCHANAN. What is your idea as to whether we ought to be in a rush about selling this stumpage?

Colonel GREELEY. I do not think we should be in a terrible rush to sell it.

Mr. BUCHANAN. I am of the same opinion.

Colonel GREELEY. As a matter of fact, during my two years as Forester I have rejected a number of applications for national forest timber. In every instance we are limiting the cut from a national forest to what it will sustain by growth and after we have reached that amount we decline further business. Take the Coeur d'Alene National Forest, in the heart of the white pine belt of northern Idaho. We have found by a close study that that forest will grow between 45,000,000 and 50,000,000 feet a year and keep it up perpetually. The annual sales are limited to that amount, although we could sell out the entire forest in a couple of years if we accepted all applications.

Mr. BUCHANAN. Do you not think the Forest Service ought to have some study made and some plan evolved by which it could determine how much ought to be sold and how much ought not to be sold in order to conserve, as far as possible, through a sufficient period of time, the timber resources of the United States?

Colonel GREELEY. Our policy is this: We have approximately 590,000,000,000 feet of merchantable timber in the national forests; and we find that we can cut up to seven or eight billion feet a year and maintain that cut perpetually, probably increasing it in time.

Mr. BUCHANAN. How much a year?

Colonel GREELEY. Seven or eight billion feet a year, which represents what you might say is the interest on the capital investment.

Mr. BUCHANAN. And keep it up?

Colonel GREELEY. Keep it up perpetually.

Mr. BUCHANAN. Is this something which you have worked out and determined, or are you merely studying it?

Colonel GREELEY. It is something we are studying and checking all the time; that is our best judgment to date. Our general aim under this item and under the timber sale administration is to select the areas where cutting is most necessary on account of the condition

of the timber. These are all virgin forests, and a good many of them have reached a point where the timber is deteriorating from old age—decaying—and where to postpone cutting would be a waste. Those are the places where we are locating new cutting operations.

Mr. ANDERSON. Will this \$100,000 enable you to make the surveys which ought to be made to support the sales which it will be proper to consummate and which it is probable will be consummated?

Colonel GREELEY. I think not, Mr. Chairman. In my judgment, with this item at its present figure, we will have to curtail the increase in timber sales which would be desirable and proper from the standpoint of the condition of the stumpage.

Mr. BUCHANAN. About how many feet have you surveyed and how much will this survey?

Colonel GREELEY. This \$100,000?

Mr. BUCHANAN. Yes.

Colonel GREELEY. This \$100,000 will probably cover from five to six billion feet.

Mr. BUCHANAN. Then if you had a demand for what you have already surveyed you would have enough to meet your current demands, that is, enough for you to sell seven or eight billion feet?

Colonel GREELEY. Yes, sir.

Mr. BUCHANAN. Because you have over 2,000,000,000 feet already surveyed?

Colonel GREELEY. Oh, yes; we can meet the situation partly in that way. The difficulty arises, however, that we ought to be able to extend the surveys much more rapidly than we have been able to do in advance of these applications, in order to know where the timber is that is most in need of cutting.

Mr. BUCHANAN. The old timber?

Colonel GREELEY. Yes. We have not been able to get a sufficiently broad, comprehensive knowledge of the entire 80,000,000 acres, which is a pretty big parcel of land.

Mr. BUCHANAN. Does it take this character of survey to determine the old timber?

Colonel GREELEY. It takes a fairly intensive survey, Mr. Buchanan, to determine where the old timber is and to get the necessary information for a proper appraisal. You see, we are required by law to appraise the commercial value of this stumpage, and with the values of some of these sales running into millions of dollars we have got to have exact data. It would not be right to sell the timber without it.

MISCELLANEOUS FOREST INVESTIGATIONS.

Mr. ANDERSON. We will take up the next item, which is on page 162, for other miscellaneous forest investigations, etc.

Colonel GREELEY. This is another item which is unchanged. The fund is used for the preparation and editing of publications, the furnishing of information to the public, and some for the preparation of forestry exhibits. A portion of the fund also goes into the preparation and printing of maps and the maintenance of statistical records for all the needs of the service.

Mr. BUCHANAN. This is used to follow up the work already done?

Colonel GREELEY. Yes, sir.

CONSTRUCTION AND MAINTENANCE OF ROADS, TRAILS, BRIDGES, ETC.

Mr. ANDERSON. We will take up the next item, page 163, for the construction and maintenance of roads, trails, bridges, etc.

Colonel GREELEY. Under this item there is provision for an increase of \$23,000—from \$425,000 to \$448,000. This is the item upon which the service has to rely chiefly in extending over our 157,000,000 acres of land, telephone lines, lookout towers, quarters for the rangers, cabins for the shelter of forest guards, bridges, and other improvements needed in protection and administration. We are making fair progress in the construction of these improvements. For example, we have completed 417 lookout cabins or other structures at the points where the lookout watchmen must be stationed during the summer season. We need about 200 additional structures of that character to complete the system. We have constructed to date nearly 28,000 miles of telephone lines to connect up the field force and permit of its quick mobilization in case of fire.

We still need about 7,000 miles of telephone lines and have other urgent improvements to build which run up to a good many hundreds of thousands of dollars. As a part of good business administration we are finding it unavoidable to spend about \$200,000 per year out of this fund on the maintenance of the improvements already constructed which, of course, reduces materially our ability to construct new improvements.

The increase of \$23,000 which is requested in this item is sought for the specific purpose of constructing more range improvements. We have been able this past year to put \$25,000 into the construction of fences, either boundary fences or division fences on our range lands, the development of water on stock ranges which were not fully utilized because of the lack of water, and the grubbing out of poisonous plants from valuable forage land which was not being used because of excessive losses of live stock from larkspur, loco weed, and other poisonous plants. I spent the greater part of the past summer in a personal inspection of our grazing situation in the regions where it is in its most intensive form, Utah, Arizona, and New Mexico, and became satisfied, from my own investigation and check upon the recommendations I had received from many other men in the service and outside, that the Government ought to do a good deal more than we have yet been able to attempt in fencing and improving these national forest ranges.

In Arizona particularly we are finding it extremely difficult to control our ranges to the extent necessary for their protection. That is still an open-range country primarily. The outside public range has partly disappeared on account of settlement, and the rest of it has, to a large extent, become seriously run down on account of excessive and unregulated use. That means, from the very nature of things, that the live stock on the outside are constantly crowding into the national forests. The drifting of unpermitted stock from the outside ranges onto the national forests is a constant problem which we have on our hands. We can control it in part by trespass proceedings and that sort of thing, but we can never control it effectively and build up our own ranges to the extent that they should be built up until we do a lot of fencing in that country. I became personally convinced of that fact this past summer.

Mr. BUCHANAN. You can not control it at all by trespass proceedings, can you? If the Government land is not fenced and these unpermitted cattle go over on the Government land, how can you control the situation by trespass proceedings?

Colonel GREELEY. We can control it in this way: The stock allowed on the Government land is all covered by grazing permits, and the grazing of stock in the national forests without permits is a trespass. It is recognized as such by the Federal courts. If you can catch the unpermitted stock and identify its ownership you have, theoretically at least, a perfectly good trespass case.

Mr. BUCHANAN. Theoretically you have but practically—

Colonel GREELEY (interposing). But as a practical proposition it will not work.

Mr. BUCHANAN. That is because there will be a trespass here and there, and the matters will be so small that they will not be worth the trouble?

Colonel GREELEY. Exactly. Another thing which I found from my personal inspection, and which has been checked up by our grazing experts much more widely, is the fact that we still have a good deal of range which is not fully utilized because of lack of water. We still have many grazing allotments where the stock crowds in around the water holes and a lot of good forage is not utilized in outlying parts of the range because of lack of water.

RECOVERY OF COST OF OUTLAY FOR GRAZING LAND.

Mr. BUCHANAN. How long would it take the average grazing land to pay back the appropriations necessary to make those improvements?

Colonel GREELEY. Under ordinary conditions you would recover the cost of the outlay in six to eight years through increased grazing receipts. There have been some striking cases where the return has been much quicker than that. To give you an illustration, on the Custer National Forest, in eastern Montana, we found it necessary, on account of the drift of outside cattle, to practically fence the entire boundary. We secured a good deal of cooperation from the stockmen themselves in doing that.

As a result of that fencing we stabilized the whole situation; the Government range is to-day in much better shape; the permittees are not bothered by trespassing stock; and we were able to put into effect on that forest a grazing fee amounting to 20 cents per head more than similar adjoining range was commanding. This is, notwithstanding the fact that the improvement had been partly paid for by the stockmen themselves. That forest range grazes 23,000 head of cattle, so that we now get an increased return equivalent to \$4,600 a year, because of the construction of those improvements.

We have had cases where the investment of \$1,500 to develop a spring has made possible a five months' range for a band of 1,200 sheep, range that formerly was not used at all. There are a good many cases of that character. In the aggregate, they make up a situation where I feel that the investment of a reasonable amount of money in range improvements is one of the most constructive things the Government can do. It will benefit the live-stock in-

dustry of the West very greatly. We have had this situation: A large permittee on one of our Arizona forests, who was in the same sort of financial difficulties that many of them have been through during the last two years, told our supervisor that in endeavoring to extend his borrowings from Los Angeles banks he had been told that his credit could not be extended until his range was under fence; this was because of the experience of western live-stocks banks as to the security of cattle which are grazed on a fenced range as distinguished from those grazed on an open range.

That man's range is partly in the national forest. He came to us and asked how he could get that national forest range under fence. We will probably be able to work out a cooperative arrangement with him under which we will furnish the wire and staples and his organization will furnish the labor and get that range under fence. Our land is bettered by it, his business is bettered by it, and his credit is bettered by it. It is a very constructive thing and I believe is thoroughly worth while.

We can probably get a dollar from the live-stock interests to go into this kind of development for every dollar that the Government puts into it. It is important, however, that these range improvements be owned by the Government. In the development of our grazing, the necessity for adjusting range allotments and the need that occasionally happens for cutting down the large herds of an old user to protect the range or make room for the small herds of a settler, the ownership of range improvements by stockmen, on Government land, is an embarrassing thing. I think our policy should be to do this work with sufficient Government funds so that the title to the improvements rests unquestionably with the Government, and it is in line with that policy that I have asked for the increase in this item.

Mr. BUCHANAN. Mr. Chairman, you will notice there are some omissions in this item.

CHANGE OF LANGUAGE.

Mr. ANDERSON. You are omitting the two provisos in the section because they are permanent law?

Colonel GREELEY. I think it is a useless waste of paper to put them in every year.

Mr. BUCHANAN. That is permanent law?

Mr. ANDERSON. Yes; we made it permanent law last year.

The next item appears to be on page 167.

APPROPRIATION UNDER ACT OF MARCH 1, 1921.

Colonel GREELEY. The change proposed in the item appearing on page 167 is an extension of the amount appropriated under the act of March 1, 1911, that may be expended in the District of Columbia. It involves no additional appropriation. The act of March 1, 1911, is the basic act under which appropriations are not only made for the purchase of national forests, but also for cooperation with States in fire protection. Since that act was passed appropriations for land purchases have not increased, but the appropriations for cooperative fire protection with the States have been more than trebled. That

makes it necessary to increase, to some extent, the expenditures for administration within the District of Columbia. For that reason we ask for an extension of this limit. We may not find it necessary to use this full extension during the present year, particularly of the appropriation for land purchases is kept on the basis recommended by the Director of the Budget—that is, the same amount as last year; but the leeway would be desirable as a matter of good administration.

COOPERATIVE FIRE PROTECTION OF FORESTED WATERSHEDS OF NAVIGABLE STREAMS.

Mr. ANDERSON. Your next item, I believe, is on page 313, cooperative fire protection of forested watersheds of navigable streams.

Colonel GREELEY. The amount proposed is the same as during the current year, \$400,000. That amount is spent in this fashion: We have cooperative agreements with 26 States, each of which must spend at least as much as the Federal Government contributes and most of which spend a great deal more. These 26 States spent a total of \$373,107 of Government funds for the personal services of rangers, lookout watchmen, and patrolmen who are incorporated in the fire-protection organization of the State. The cost of administration amounts to \$25,792. There was a balance of \$1,100 for contingencies, but since this statement was prepared it has been entirely allotted to some of the States in order to meet fire emergencies. The 26 cooperating States will expend during 1922 \$1,896,000, or about four and a half times as much as the Federal appropriation.

Mr. ANDERSON. Let me ask you there, is that for their own forest protection?

Colonel GREELEY. That is on their own forest protection exclusively, leaving out other forest activities. In addition to that, private forest owners or associations of forest owners will expend this year between \$1,000,000 and \$1,200,000, or about two and a half times as much as the Federal appropriation. In other words, leaving the national forests out of consideration since this money is used to encourage forest protection on private lands, the total outlay from all sources is now approximately \$3,327,000 a year, of which the Federal Government contributes 12 per cent and the States and private owners the rest.

Mr. BUCHANAN. Will you furnish a statement showing the allotment of these funds to the States and the amounts expended by them?

Colonel GREELEY. I will be glad to do that.

(The statement referred to follows:)

Cooperative expenditures in fire protection under the Weeks law, fiscal year 1922.

| State. | Federal. | State. | Total. |
|------------------------------------|-------------|--------------|--------------|
| Maine..... | \$42,150.00 | \$228,632.24 | \$270,782.24 |
| New Hampshire..... | 8,787.08 | 45,526.21 | 54,313.29 |
| Vermont..... | 4,150.00 | 11,933.62 | 16,083.62 |
| Massachusetts..... | 11,450.00 | 67,316.11 | 78,766.11 |
| Rhode Island..... | 1,055.09 | 6,384.59 | 7,439.68 |
| Connecticut..... | 4,750.00 | 17,181.11 | 21,931.11 |
| New York..... | 26,892.84 | 163,371.19 | 190,264.03 |
| New Jersey..... | 7,950.00 | 34,831.57 | 42,781.57 |
| Pennsylvania..... | 27,500.00 | 512,190.56 | 539,690.56 |
| Maryland..... | 3,000.00 | 6,722.79 | 9,722.79 |
| Virginia..... | 16,786.55 | 16,786.55 | 33,573.10 |
| West Virginia..... | 6,655.58 | 9,186.19 | 15,841.77 |
| North Carolina..... | 9,506.91 | 9,506.92 | 19,013.83 |
| Tennessee..... | 10,381.58 | 11,566.84 | 21,948.42 |
| Louisiana..... | 12,600.00 | 39,771.88 | 52,371.88 |
| Texas..... | 10,500.00 | 14,004.35 | 24,504.35 |
| Ohio..... | 143.03 | 679.00 | 822.03 |
| Michigan..... | 25,000.00 | 140,367.48 | 165,367.48 |
| Wisconsin..... | 12,650.86 | 17,308.23 | 29,959.09 |
| Minnesota..... | 27,300.00 | 233,011.47 | 260,311.47 |
| South Dakota..... | 100.00 | 7,724.00 | 7,824.00 |
| Montana..... | 8,746.03 | 15,490.00 | 24,236.03 |
| Idaho, north..... | 16,800.00 | 39,985.95 | 56,785.95 |
| Idaho, south..... | 3,146.16 | 8,784.75 | 11,930.91 |
| Washington..... | 24,900.00 | 69,034.03 | 93,934.03 |
| Oregon..... | 27,455.38 | 107,649.63 | 135,105.01 |
| California..... | 22,749.98 | 61,983.17 | 84,733.15 |
| Administration and inspection..... | 25,792.12 | | 25,792.12 |
| Total..... | 398,899.19 | 1,896,920.43 | 2,295,819.62 |
| Unexpended balance..... | 1,100.81 | | |
| Appropriation..... | 400,000.00 | | |

RESULTS RECEIVED FROM COOPERATION WITH LOCAL AGENCIES.

Colonel GREELEY. This activity, I believe, is a splendid demonstration of what can be accomplished through cooperation with local agencies with comparatively small Federal outlays. When this work was started in 1912 the expenditures of all the States for forest protection did not exceed \$350,000 a year. In the 11 years during which this work has been conducted, and to a considerable extent as a result of Federal cooperation, State expenditures for fire protection have increased nearly sixfold, and the private expenditures for fire protection have increased at least threefold. The States cooperating with the Federal Government have increased from 11 in 1912 to 26 in 1922. That means that in these 11 years 15 States which had no forest protection system have organized one and have qualified for cooperation by establishing what, in the judgment of the Forest Service, is a reasonably efficient system for protecting their forest lands. The acreage which is protected has increased from about 61,000,000 acres in 1912 to about 166,000,000 acres in 1922.

Aside from the increase in expenditures and acreage, this cooperation has resulted in some striking betterments in the forest laws of the States. We make a good deal of our inspection under this law. We have experienced and competent men who inspect the protective work of each of the cooperating States every year. The inspector does a great deal more than simply check up the efficiency with which the Federal contribution is being expended. He takes the good suggestions and good methods developed by one State to the next

State; he is an instructor; he gets a line on a particular situation in a State that is not being effectively handled and gives the state officers practical suggestions and advice. By using experienced and tactful men on this work, we have been able to get over a good many suggestions which have led to improvements in the State organizations and to better State laws dealing with fire protection and slash disposal.

COOPERATION WITH STATES.

In two or three cases laws have been received which require financial contributions to the State's fire-protection system by the owners of the land. There are about half a dozen States in the country that now have legislation of that character in one form or another; and it represents an important phase of this movement for nationwide forest protection, in which the Federal cooperation has been a leading factor. Another thing which we have emphasized in our inspections everywhere has been the policy that the Federal funds must not be used to protect valuable merchantable timber, which we regard as an obligation that the owner of the land should assume, but primarily to extend the protection system over the cut-over lands, the denuded lands, and lands containing young growth, in which the owner may not have any very great interest.

There are enormous areas of such lands in the country which are being held by the owners without any very tangible idea of what they are going to do with them and without much interest or concern over what happens to them. By extending the protection system over these cut-over and second-growth lands we are inculcating everywhere the idea that this protection is for the sake of future forest growth. From that standpoint alone the Federal cooperation has been of very great value. That is all I have to say on this item. We are still short of what we ought to be doing, but the times do not look propitious for securing an increase.

ACQUISITION OF ADDITIONAL FOREST LANDS.

Mr. ANDERSON. We will take up the item on page 315 for the acquisition of additional lands at headwaters of navigable streams.

Colonel GREELEY. The National Forest Reservation Commission recommends an appropriation of \$2,000,000 for forest purchases under the act of March 1, 1911. The item as it comes to you from the Bureau of the Budget is the same as for the present year, \$450,000.

Up to July 1 of this year a total of \$12,577,000 has been actually expended or obligated for the purchase of land under the act of March 1, 1911. In return for this expenditure the Government has acquired title to 2,142,000 acres of forest land, at an average cost of \$5.87 per acre. That average cost includes the overhead expenses, the cost of the land examinations by appraisers, the cost of the examination of titles, which is often high on account of the exacting requirements of the Department of Justice, and the cost of cadastral surveys to determine the exact area of each tract.

PURCHASE OF LANDS.

During the last fiscal year purchase agreements were made covering 241,000 acres at an average cost, for the land itself and excluding overhead charges, of \$3.31 per acre. I mention that because it is

the lowest average cost for which lands have been purchased since this policy began and because it indicates that the cut-over land market in the Eastern States at the present time is distinctly a buyer's market. We have to-day the most favorable opportunity to get bargains in forest land that we have ever had.

The National Forest Reservation Commission up to the present time has approved 23 purchase units. If the committee is interested in knowing just where they are, it can see them on this map. The purchase units in dark green are the ones which have been approved by the commission and on which active purchases are in progress. The hatching on each little diagram shows the extent to which the ownership of that area has been acquired by the Government. The units indicated in light green have been examined or are under consideration, but none of them have yet been approved by the commission as purchase areas. Before purchases in any locality are begun, the commission must approve a specific purchase unit therein. The approval of the Geological Survey as to the beneficial relation of the forest cover in that region to the flow of navigable streams is also required.

Mr. BUCHANAN. Are these all mountain lands?

Colonel GREELEY. These are all mountain lands. This purchase unit covers the White Mountains in New Hampshire. This purchase unit [indicating] is on the Allegheny watershed, one of the units in which the people of Pittsburgh and Cincinnati are very much interested on account of flood control. These purchases [indicating] run down the crests of the southern Appalachian ranges.

TIMBER GROWTH.

Mr. BUCHANAN. Do these lands have any young timber growth on them?

Colonel GREELEY. They have a great deal of timber growth, both young and old. As a matter of fact, with our two million one hundred and forty-odd thousand acres of land we have acquired about 5,000,000,000 feet of timber. Some of it is inaccessible and some of it is land from which the better species have been culled. We have, however, a good deal of timber of high commercial value. As a matter of fact, we are now obtaining from these national forests a yearly income of between \$90,000 and \$100,000 from timber sales, continuing again the same policy of cautious cutting and keeping within the growing capacity of the forests.

VALUE OF TIMBER LAND BOUGHT.

Mr. BUCHANAN. What percentage of the \$90,000 or \$100,000 does it take to get the timber out and pay the overhead charges? Is the work self-supporting?

Colonel GREELEY. Those forests are now about self-sustaining; that is, as to current costs for protection and administration. Of course, to date we have been cautious in making sales in these areas. We are watching the watershed situation very closely and we make no sales at all until they have been thoroughly considered. The Government now has a very valuable timber property in those forests and it has increased a good deal in value since the land was bought. In fact, our experience in this purchase work emphasizes a remark made by

a former distinguished citizen of your State, Mr. Chairman, the elder Weyerhaeuser, who has been called America's "lumber king." He was asked whether he ever lost money in buying timber and he replied that the only time he lost money was when he did not buy timberland. These forest lands that the Government has bought since 1911 have, in the aggregate, already appreciated in value to a considerable degree. Two summers ago I inspected an area in the Pisgah National Forest in North Carolina, where we had made a sale of old poplar, oak, and chestnut stumpage. I found that the timber sale, which covered about one-third of one of the tracts purchased, would return more than the entire cost of the whole tract, timber and land combined, and leave us two-thirds of the tract still uncut.

Mr. BUCHANAN. Taking all of these purchases together, will the sale of timber pay all the overhead charges as well as charges for caring for the land?

Colonel GREELEY. Yes; sir; excluding charges for special improvements, like roads.

Mr. BUCHANAN. Then the Government would get free the growth of timber after reforesting?

Colonel GREELEY. Yes, sir.

Mr. BUCHANAN. You think it would pay all the overhead charges?

Colonel GREELEY. Yes, sir.

Mr. BUCHANAN. And all the Government would lose would be the interest on the money?

Colonel GREELEY. That is all. The Government would get the further benefit of the appreciation in timber values, as well as the protection of the watersheds.

In the purchase units which the National Forest Reservation Commission has approved, about 31 per cent of the area has been bought. It is our policy to have enough purchase units within which lands may be offered to maintain a considerable degree of competition in the offerings to the Government. That is one reason why we have been able to get these lands at relatively low prices. We now have outstanding offers in these units which aggregate 891,000 acres and between \$5,000,000 and \$6,000,000 in the offered price. We can probably get that land at considerably less than the offered prices by making a careful appraisal, finding out exactly what there is, and then negotiating with the owner for a favorable option, with the owner knowing that his option will be considered in competition with options obtained from other owners in that purchase unit or in other units and that only what we regard as distinctly desirable purchases will be submitted to the National Forest Reservation Commission.

EDUCATIONAL VALUE.

There is another effect of this purchase work that I want to speak of, and that is its educational value. We find in each of these regions where we establish a national forest and put into effect a system of fire protection and a conservative system of cutting timber, and have rangers and supervisors on the ground, that inside of six or eight years you can begin to see the effects upon the local people. The national forest becomes more or less a center of organized fire protection. We endeavor to cooperate with the owners of adjoining

lands and induce them to protect their own lands. It is good business for us to do so, because if their lands are well protected our lands are safer. Adjoining owners ask to see our timber sale contracts; they see how our cutting is done; and there have been many cases where land owners have copied provisions from Forest Service sale contracts in the sale of their own stumpage. All of our work has a great educational value to the locality and the owners of adjoining lands.

Mr. BUCHANAN. I understood you to say that 31 per cent had been bought.

Colonel GREELEY. Thirty-one per cent of the area of these approved units.

Mr. BUCHANAN. Suppose the other 69 per cent is bought. Is the work then over?

Colonel GREELEY. If the other percentage is bought, the units would be complete and the buying in those areas would be finished; yes, sir. The question then would be how far the Government should extend this policy; but as to those specific units which the commission has approved the thing will be done.

Mr. BUCHANAN. And on the 31 per cent how much did you say was spent?

Colonel GREELEY. On the 31 per cent we have spent a little over \$12,000,000. Multiply that by three and you get approximately the cost of finishing these purchase areas.

Mr. BUCHANAN. About \$40,000,000 more?

Colonel GREELEY. We will not recommend 100 per cent purchases in all of those units, probably not in any of them. There are certain lands which may be held at such high prices that we could not recommend their purchase as a business proposition. There are certain other lands whose owners have put into effect a good system of protection and management. We do not recommend that the Federal Government buy such holdings. You might say that on the average 60 per cent would represent the completion of these units.

Mr. BUCHANAN. After you finish that area then would it be the policy of the department to go on to other areas?

Colonel GREELEY. I think it should be done within reasonable limits. Right in line with that question I would like to advance an additional idea or two. This work has been continued without a break since 1911 and the initial program has been accomplished to the extent of 31 per cent. The showing to date makes it very clear that the outlays for this purpose are really investments rather than expenditures, because the Government is building up a valuable property and that property is enhancing in value. We could close out this proposition in a short time, if Congress ordered us to do so, and come out with a profit over and above the entire cost of the enterprise, including what has been spent for the protection of the lands after they were purchased.

The present is a favorable time to make such purchases because the financial depression has resulted in a low scale of values for forest lands, particularly cut-over lands. We have been able to buy large tracts in the Allegheny Mountains of Pennsylvania at \$2.50 per acre and other large tracts in West Virginia for corresponding prices. If the Federal Government intends to pursue this policy it probably will never have a more favorable time to buy forest lands at low prices.

EXTENSION FEATURES.

Now, in regard to its extension. From the standpoint of protecting watersheds, of growing timber and of giving a practical demonstration in forestry to the people of a region, there are certain key areas where a small Federal national forest would be very desirable. We have not covered them all by any means in this list of approved units. I think it would be a very desirable thing, for example, to have a small national forest in the Ozark Mountains of Missouri. That is a region where there is an enormous area of rough mountain land not suited for agriculture, where the bulk of the merchantable timber has been cut and where the land is now more or less hanging in the balance. Much of it is burned over frequently, is deteriorating, and is producing little or nothing. Somebody, I think, should go in there and demonstrate, in a practical way, what can be done with that kind of land. I think it would be a good thing to have a national forest or two in the mountains of Kentucky, where we have none. Of course, it is a question of general policy as to how far such purchases should be carried.

The Government, obviously, can not buy any large proportion of the privately owned lands in the country, but I would favor the creation of small national forests at points where the three purposes, watershed protection, the growing of timber, and the demonstration of good forest practice give the Federal Government the best chance to make a ten-strike.

Mr. BUCHANAN. Does real timber grow on these mountains or just scrubby stuff?

Colonel GREELEY. Real timber; the finest poplar and white oak in the world grow in the southern Appalachians.

OLYMPIC NATIONAL FOREST.

DISPOSAL OF AND PROTECTION FROM FIRE OF WIND-THROWN TIMBER.

Mr. ANDERSON. The next item is on page 341.

Colonel GREELEY. That is the item which relates to special protection on the Olympic National Forest. We have recommended a reduction from \$33,000 to \$25,000 for the ensuing year. We hope it will not be many years before this item can disappear altogether. We have been able, by very intensive methods and with fine cooperation from the State of Washington, to carry this Olympic blow-down through two fire seasons without any destructive fires at all. That has meant an intensive protection organization over 2,200 square miles of land, which contains more or less blown-down timber, batches of wind falls being scattered all over it. It will require approximately \$22,000 to maintain the present organization of men and equipment and \$25,000 will give us a leeway of about \$3,000 for keeping up and extending the trails and telephone lines which are a vital factor in the protection of this enormous area.

I presume the committee understands that what we are really protecting, in cooperation with the State of Washington, is one of the largest reserves of timber anywhere in the country, on the Olympic Peninsula. The Olympic Peninsula contains, I suppose, ninety or one hundred billion feet of timber, partly in Government ownership, but more largely in private ownership. The timber has not yet been cut

to any extent and it constitutes, by reason of its location, one of the largest and most valuable reserve areas in the United States. This blow down went right through the heart of it, and in protecting the damaged strip we are protecting primarily the enormous and very valuable timber region around it. With two or three more years the growth of vegetation and rotting of the blown-down timber will greatly reduce the fire hazard, and I hope we can cut this item from time to time and in the course of no great length of time absorb it entirely in our regular appropriations.

Mr. JUMP. You will observe that that item carries a decrease of \$8,000 for 1924.

FOR PROTECTION OF OREGON AND CALIFORNIA RAILROAD LANDS AND
COOS BAY WAGON ROAD TRAILS.

Mr. ANDERSON. The next item is on page 343. As I recall, this is a proposition that was taken over by the Department of the Interior some years ago.

Colonel GREELEY. That is work which the Forest Service has assumed at the request of the Interior Department. The protection of these railway-grant lands, which have been reverted in the United States, was first provided for in the sundry civil bill for 1916. In the fiscal year 1922 the Forest Service assumed it at the request of the Interior Department, because a large part of the lands are intermingled with the national forests in Oregon. The actual cost of protecting these lands has ranged from \$37,000 to \$43,000 a year, depending on the character of the season. During the last fiscal year the actual cost was \$41,000.

An appropriation of \$35,000 means that we have got to protect the land for less than 15 mills per acre, which is less than we can do, except in an unusually favorable season. The cost of protecting the national forests as a whole amounts to 17 mills per acre in a normal year. We requested the Bureau of the Budget to increase this item to \$40,000 on the basis of the average cost actually incurred during the past five years, but the Director of the Budget thought we ought to hold it at \$35,000. This means that we have got to ask for a deficiency unless we have an exceptionally favorable summer. The land contains about forty or fifty billion feet of timber and is an extremely valuable property. There is no question about the need of sustained protection.

Mr. ANDERSON. We will take up the item on page 356. That is apparently an appropriation already made.

Colonel GREELEY. The item on page 356 is simply an enumeration of appropriations previously made.

FOREST ROADS AND TRAILS.

AUTHORIZATION OF APPROPRIATION IN FEDERAL HIGHWAY ACT.

Mr. ANDERSON. We will next take up the item on page 359, forest roads and trails.

Colonel GREELEY. The item on page 359 is an appropriation authorized by Congress but not hitherto specifically made. In passing the Federal highway act of November 9, 1921, Congress defined the general policy that appropriations for the construction

of roads and trails in the national forests should go hand in hand with appropriations for Federal aid to post roads. That act appropriated \$5,000,000 for the fiscal year 1922 and \$10,000,000 for the fiscal year 1923 for the construction of roads and trails within or adjacent to national forests. A subsequent act, that of June 19, 1922, authorized an appropriation of \$6,500,000 each for the fiscal years 1924 and 1925, in pursuance of this same policy. The Director of the Budget now recommends an appropriation for 1924 of \$3,000,000 out of the \$6,500,000 which was authorized by Congress. I do not know how far the committee wishes me to go into a discussion of this road-building program.

Mr. ANDERSON. I would like to go into it pretty thoroughly.

Colonel GREELEY. It is a pretty big subject and has been threshed out before congressional committees several times, but I will be very glad to tell you the story if you wish to listen.

Mr. JUMP. Mr. Chairman, suppose we defer consideration of this item until Mr. MacDonald appears in connection with the Federal aid road item?

Mr. ANDERSON. That will be satisfactory.

WEDNESDAY, NOVEMBER 22, 1922.

FOREST ROADS AND TRAILS.

Mr. ANDERSON. We will hear Colonel Greeley with reference to the item on page 359 for national forest roads.

AUTHORIZATION FOR APPROPRIATION.

Colonel GREELEY. Mr. Chairman, as I explained to the committee the other day, Federal-aid legislation as expressed in the last two statutes, the Federal highway act of November, 1921, and the act of June 30, 1922, has recognized the need for the construction of roads in and adjacent to the national forests as a part of the Federal road policy. Sums were authorized for continuing the forest road work in the last general legislation dealing with this subject, to the extent of \$6,500,000 each for the fiscal years 1924 and 1925. This item comes before you now as a part of our 1924 Budget, with the recommendation of the Director of the Budget that \$3,000,000 be appropriated out of the authorization of \$6,500,000.

Mr. ANDERSON. Was the \$6,500,000 authorized to be expended in any particular period?

Colonel GREELEY. According to the terms of the legislation it remains available until expended. The law authorizes an appropriation for a certain fiscal year, to remain available until expended. You mean, is there a limit on the period of the authorization?

Mr. ANDERSON. Yes.

Colonel GREELEY. My judgment would be that this authorization expires with the fiscal year 1924. The authorization is made specifically for the fiscal year. Is that your understanding of it, Mr. MacDonald, as a matter of law?

Mr. MACDONALD. I never thought of that question before. My own belief has been that those authorizations hold until expended.

Mr. ANDERSON. My recollection is that there was a three-year authorization in the general program.

Mr. MACDONALD. Yes, sir.

Mr. ANDERSON. That would only carry appropriations for the three years for which the authorization was made. I was wondering whether this \$6,500,000 was carried under language which would permit making the appropriation for any one of three years covered by the general proposition, or whether this only covered one year.

Colonel GREELEY. I have here the act itself. This is section 4, paragraph 2, of the act approved June 19, 1922, as follows:

For the purpose of carrying out the provisions of section 23 of the Federal highway act, approved November 9, 1921, there is hereby authorized to be appropriated for forest roads and trails, out of any money in the Treasury not otherwise appropriated, the following additional sums, to be made available until expended, in accordance with the provisions of said section 23: The sum of six million five hundred thousand dollars for the fiscal year ending June 30, 1924. The sum of six million five hundred thousand dollars for the fiscal year ending June 30, 1925.

Mr. ANDERSON. That only covers two years.

Mr. BUCHANAN. It expires with the appropriation for that fiscal year.

Colonel GREELEY. That would be my impression.

Mr. JUMP. If it said "during" the fiscal year 1923.

Mr. BUCHANAN. The very wording of the act, making one appropriation for one year, 1924, and another appropriation for the following year, 1925, shows that it was intended to have that for each year.

Mr. JUMP. Our impression was that they intended to make that amount of money available until the rate of expenditures required further appropriations under the authorization.

Mr. BUCHANAN. It says in accordance with section 23. What is section 23?

Colonel GREELEY. That is section 23 of the act of November 19, 1921. It is a section that covers a printed page of the act. I have it here and will read it, if you desire to have it read.

I might say, Mr. Chairman, that in accordance with the terms of that section, to which Mr. Buchanan referred, any appropriation made for the construction of forest roads up to an amount of \$6,000,000 in any year is divided equally between roads of primary service to the States, counties, or communities in the national forest regions, and roads and trails of primary service for the protection and administration of the national forests themselves. In other words, the legislation recognizes the two big purposes to be served by forest roads; first, the extension of public highways, State roads, county roads, and community roads over the national forests, making them contribute a reasonable share toward the completion of the public-road system in their regions; and, second, building on to that public-road system the roads and trails needed primarily to protect the national forests themselves and to develop their resources.

Under the terms of the law any appropriation up to \$6,000,000 is split equally between those two classes of roads. Our method of expenditure, as defined by regulations of the Secretary of Agriculture, provides for a cooperative working out of highway plans with the State

highway commissions and the Bureau of Public Roads, which handles the technical engineering features of this work throughout. We develop a common plan, as far as possible, with the States, and designate under that the roads which fit into these two classes.

The public roads which form component parts of the highway system of the States or counties are necessarily roads of the higher standards, which require the application of highway engineering. Those roads are built entirely by the Bureau of Public Roads. The protection and development roads coming under the other classification consist largely of rough, inexpensive roads built cheaply to open up our inaccessible regions in the national forests. They are roads which do not require any particular degree of technical highway skill in their construction, and are built by our field organization of rangers and supervisors.

Any attempt to estimate the roads needed to complete the public road system through the national forests and also supply the protective facilities required on these Government properties themselves are necessarily rough and run up into very high figures. We estimate, however, that nearly 15,000 miles will be necessary ultimately to complete the public roads which must traverse national forests.

Those 15,000 miles are estimated to cost in the neighborhood of \$112,000,000.

We estimate that the protection and development roads needed to open up the national forests will ultimately amount to a little over 14,000 miles, costing about \$54,000,000, and that the trails still needed for protection and administrative purposes will run up to about 40,000 miles, with a cost of something over \$11,000,000. The whole program of roads and trails runs up to something like \$178,000,000, necessarily requiring a long time to build, and of course containing items of varying degrees of urgency. This represents, in a rough way, the ultimate system that we must plan for. The work to date has progressed under former appropriations to a point that represents a very substantial beginning. I do not know whether the committee cares for any of these progress tables showing what has actually been done.

Mr. ANDERSON. I think it would be a good idea to put them in the record.

Colonel GREELEY. They amount to a total of 4,785 miles of roads constructed, 6,710 miles of trails constructed, and approximately 8,000 miles of roads and trails maintained.

(The tables referred to are as follows:)

Construction, improvement, and maintenance of roads and trails from forest road appropriations and other Federal and cooperative funds, by States.

| State. | Calendar year 1921. | | Total to Dec. 31, 1921. | | | Expenditures to Dec. 30, 1921. | | |
|---------------------|---------------------|---------------------|-------------------------|---------------------|------------------------------|--------------------------------|--------------|---------------|
| | Roads constructed. | Trails constructed. | Roads constructed. | Trails constructed. | Roads and trails maintained. | Federal. | Cooperative. | Total funds. |
| | Miles. | Miles. | Miles. | Miles. | Miles. | | | |
| Alabama..... | 22.4 | 17.2 | 62.6 | 57.3 | 10.0 | \$733.50 | | \$733.50 |
| Alaska..... | 22.4 | 17.2 | 62.6 | 57.3 | 37.5 | 485,096.81 | \$164,806.16 | 649,902.97 |
| Arizona..... | 85.2 | 268.5 | 295.3 | 481.1 | 209.0 | 845,736.87 | 645,822.93 | 1,494,629.80 |
| Arkansas..... | 9.7 | 28.7 | 78.9 | 46.1 | 227.7 | 237,129.13 | 24,184.93 | 261,314.06 |
| California..... | 79.8 | 221.5 | 333.8 | 619.2 | 4,030.0 | 2,298,906.26 | 679,900.58 | 2,978,806.84 |
| Colorado..... | 77.9 | 228.3 | 331.2 | 467.6 | 137.8 | 1,400,792.50 | 435,452.81 | 1,834,245.31 |
| Florida..... | 7.2 | | 45.2 | | 42.0 | 70,291.41 | 56,600.00 | 126,891.41 |
| Georgia..... | 7.5 | 19.8 | 8.5 | 32.8 | 80.0 | 116,610.95 | | 116,610.95 |
| Idaho..... | 139.6 | 428.9 | 711.2 | 1,010.9 | 338.9 | 2,134,207.01 | 874,705.35 | 3,008,912.36 |
| Kansas..... | | | 3.4 | | | 2,111.51 | | 2,111.51 |
| Maine..... | | | | 30.0 | 35.0 | 6,169.42 | | 6,169.42 |
| Michigan..... | 7.1 | | 40.4 | | | 3,263.26 | 186.95 | 3,450.21 |
| Minnesota..... | 22.0 | 29.0 | 30.4 | 29.0 | 78.7 | 90,798.53 | 90,905.11 | 181,703.64 |
| Montana..... | 29.6 | 29.6 | 230.7 | 202.9 | 316.1 | 1,312,502.75 | 362,122.50 | 1,674,625.25 |
| Nebraska..... | 15.0 | | 23.8 | | 7.0 | 8,637.32 | | 8,637.32 |
| Nevada..... | 46.8 | 79.5 | 217.6 | 170.0 | 92.2 | 177,378.53 | 93,773.75 | 271,152.28 |
| New Hampshire..... | 2.0 | 23.0 | 5.0 | 235.0 | 246.0 | 19,285.69 | 220.26 | 19,505.94 |
| New Mexico..... | 53.8 | 147.2 | 229.2 | 464.7 | 451.8 | 820,185.75 | 179,095.32 | 999,281.07 |
| North Carolina..... | 14.4 | 14.5 | 51.7 | 45.5 | 44.6 | 177,787.71 | 31,951.17 | 209,738.88 |
| North Dakota..... | | | 1.0 | | | 65.75 | | 65.75 |
| Oklahoma..... | | | | | 20.0 | 6,230.81 | 925.00 | 7,155.81 |
| Oregon..... | 155.5 | 180.2 | 734.1 | 524.0 | 685.0 | 1,790,199.16 | 1,383,813.77 | 3,174,012.93 |
| Porto Rico..... | | | | 20.0 | 20.0 | 3,356.11 | | 3,356.11 |
| South Carolina..... | 5.3 | | 5.3 | | 5.3 | 47,310.43 | 11,000.00 | 58,310.43 |
| South Dakota..... | 23.3 | 17.6 | 66.1 | 20.6 | 26.9 | 168,691.53 | 90,638.93 | 259,330.46 |
| Tennessee..... | 8.0 | 13.0 | 11.7 | 28.5 | 211.0 | 76,258.57 | 64,559.38 | 140,817.95 |
| Utah..... | 155.0 | 106.5 | 709.5 | 595.2 | 173.3 | 856,841.75 | 533,001.06 | 1,389,842.81 |
| Virginia..... | | | 4.0 | 50.5 | 322.0 | 31,382.73 | 2,409.91 | 33,792.64 |
| Washington..... | 58.7 | 40.0 | 270.5 | 314.0 | 588.0 | 1,426,246.31 | 835,606.29 | 2,261,852.60 |
| West Virginia..... | | | | | 1,319.54 | | | 1,319.54 |
| Wyoming..... | 85.6 | 1,066.0 | 284.6 | 1,265.8 | 167.5 | 809,302.61 | 229,051.32 | 1,038,353.93 |
| Total..... | 1,104.4 | 2,950.0 | 4,785.7 | 6,710.7 | 8,744.3 | 15,424,830.21 | 6,791,893.47 | 22,216,723.68 |

Mr. ANDERSON. May I ask you whether the program you have been discussing is in addition to what has already been accomplished, or does it include roads already constructed?

Colonel GREELEY. The program I have referred to is in addition to the mileage actually built. These are figures up to December 31, 1921. There are available for this program, however, certain amounts remaining from last year's appropriations and other unexpended balances of forest road funds.

APPROPRIATIONS AVAILABLE.

Mr. ANDERSON. Will you make up a statement showing the sums which you are at liberty to spend for those roads and trails?

Colonel GREELEY. I have that, Mr. Chairman. There have been four acts of Congress making substantial appropriations for forest roads. These are in addition to the provision incorporated in our appropriation act several years ago, which automatically appropriates 10 per cent of the gross receipts from the national forests for road and trail building within their boundaries. That 10 per cent item

amounts now to about \$500,000 a year. Aside from that, which is a current item and which is almost entirely obligated for the maintenance of roads and trails formerly built, we had available at the beginning of this fiscal year a total sum of \$17,000,000 for road and trail construction. That is made up of the unexpended balances of amounts formerly appropriated.

There is the special act of February 28, 1919, the Federal forest road construction act as it is called, whose appropriations have terminated, but under which an unexpended balance of \$765,000 remains. Then we had the appropriation of \$15,000,000 carried by the Federal highway act of last November, and the current appropriation which became available under the post roads act of 1916. This act appropriated \$1,000,000 a year for a period of ten years. These appropriations and balances gave us, actually available at the beginning of the fiscal year 1923, \$17,000,000, which applies against the program I indicated. That money will be largely expended during the next two fiscal years.

Our program to date and the program of Mr. MacDonald's organization, which handles the contracts on all of the high-standard roads, contemplate an expenditure of about \$11,713,000 during this current fiscal year out of the \$17,000,000 available at its beginning.

PLAN OF WORK.

The whole point, as I see it, is this: Work of this character, to be done efficiently, requires a great deal of planning. It requires carrying on the examination of projects, and their cooperative consideration with the State authorities and other local agencies interested in road building for at least two years ahead of actual construction. We need the resources to carry the forest road program ahead at a reasonable pace, keeping the examination of projects normally two years ahead of construction and surveys normally one year ahead of construction. No construction should be ordered without advance cost estimates based upon surveys, so that all of us in the department who are responsible for this work may be assured that the money is being spent to the best advantage.

For these reasons we need to keep two years ahead on our appropriations. That, in my judgment, is the most important feature of this item. An appropriation of \$3,000,000 for the next fiscal year is less than half what Congress authorized for this purpose. It was arrived at by the Director of the Budget from this standpoint, that the road work must be continued with reasonable provision year by year, so that it can be properly planned, but that in view of the present situation of the Treasury an appropriation of \$3,000,000 for the next fiscal year is reasonable and sufficient.

Under appropriations at this rate, it is going to take us a good many years to complete even the most urgent construction necessary to develop the national forests and facilitate their protection. The building of these roads not only has a very important relationship to the protection of the national forests but also to the development of their income producing business. That was a factor which had a great deal of weight with the Committee on Roads, which originated the basic legislation dealing with this subject.

We now have one-quarter of the merchantable timber of the country in the national forests. We could cut timber to the extent of \$18,000,000 a year at present stumpage rates, were the forests accessible. The opening up of these regions, through the construction of roads, is going to enable more and more of our timber resources to be used and to be used in a rational and intelligent way. It is going to enable the timber cut to be more properly distributed rather than concentrated at a few points where there is some special industrial development. Road building is a very important factor in the full development of these national properties to serve all the purposes for which they were established.

That is all I have to say. I ask the committee to provide for continuing this work on a reasonable basis, because it is the steady, unbroken pull that counts on a job of this character.

OTHER APPROPRIATIONS AVAILABLE.

Mr. ANDERSON. Are there any appropriations made in other acts which mature this year?

Colonel GREELEY. The act of 1916 carries an appropriation of \$1,000,000 yearly up to and including the fiscal year 1926. Under that act an appropriation of \$1,000,000 becomes available July 1, 1924. That is the only continuing appropriation, with the exception of the 10 per cent of gross receipts which I spoke of and which is largely absorbed in maintenance.

Mr. MAGEE. You are authorized to expend \$6,500,000?

Colonel GREELEY. The appropriation has been authorized but not made.

Mr. MAGEE. Is that a continuing appropriation?

Colonel GREELEY. That was authorized for two specific years.

Mr. MAGEE. If we appropriate \$3,000,000 this year what becomes of the balance?

Colonel GREELEY. Well, it is simply unappropriated. Whether it remains authorized for appropriation or not I do not know.

Mr. MAGEE. That is what I was getting at.

Colonel GREELEY. That is a technical question I would not attempt to answer.

Mr. ANDERSON. I do not believe it continues.

Mr. JUMP. If that is true, I think the Budget Bureau, in passing on these items, did not have it in mind. We received the distinct impression, in our dealings with the Budget Bureau, that they had in mind, in recommending to Congress that merely a portion of these authorizations be appropriated, that the balance could be recommended, through the bureau, of course, and if passed, then appropriated by Congress, as it saw fit, under the existing authorizations, when the rate of cash withdrawals from the Treasury made that necessary.

Mr. ANDERSON. I do not see how that conclusion can be arrived at under the language of the authorization.

Mr. JUMP. That question will become much more serious when we get to the next item—that is, so far as volume is concerned—because there, of the \$65,000,000 authorized for 1924, \$35,000,000 is deferred.

Mr. ANDERSON. But you have some additional language there, which, as I recall, authorizes you to make contracts?

Mr. JUMP. It did during 1923 and it is in here for 1924; that is true.

Mr. ANDERSON. Of course that would become a continuing obligation in any event, and under our rules we could appropriate without specific authorization, but in a case of this kind it seems to me that under the language of the act itself it simply makes a maximum authorization which is controlling upon this committee, at least, in making the appropriation.

Mr. JUMP. If that is true, that is a very serious thing.

Mr. ANDERSON. From a legal point of view the obligations of the Government may be an entirely different question, but my idea is that so far as the right of this committee to report an appropriation is concerned it is an authorization for one year, and if we appropriate only a part of that authorization then the authorization, as far as it goes, is exhausted by whatever we appropriate under our rules.

Mr. MAGEE. You followed the recommendation of the Director of the Budget?

Colonel GREELEY. Well, yes; we followed it.

Mr. ANDERSON. Or he followed you?

Mr. MAGEE. Sometimes the man at the bar has a very serious contention with the judge.

Mr. ANDERSON. I recognize your attitude, but my feeling about it is that this committee, at least, is not bound by the judgment of the Bureau of the Budget as to any question of policy; if we do not think it is good business policy to appropriate \$3,000,000 we can appropriate \$1,000,000, and if we think it is better business policy to appropriate \$5,000,000 we can appropriate \$5,000,000. Now, if there are any reasons why we ought to appropriate \$5,000,000 for this item I would like to have them.

URGENCY DEMANDS APPROPRIATION BE CONTINUED.

Colonel GREELEY. Well, sir, may I reopen my statement? The only facts I would like to bring before the committee from that standpoint are these: We have a long program ahead of needed roads and trails of these several classes. There can be no question about their urgency, both from the standpoint of the national forests as Federal property to be protected and developed and also from the standpoint of our obligations to these States and counties to do a reasonable part toward extending their public road system over Federal lands.

The Bureau of Public Roads and the Forest Service together, each in their respective fields, are organized to-day to continue this work on a scale of at least \$6,500,000 a year. We expect to put through \$11,000,000 of road construction between the two organizations during the fiscal year 1923. A drop to \$6,500,000 means a very substantial cut in the product of the organization that is now actually in existence and built up with trained men, equipment, warehouses for equipment, and all that sort of thing about which Mr. MacDonald can tell you more than I can. We are organized and, I think, pretty well organized with personnel and equipment to do this work on a minimum basis of \$6,500,000 a year. Cutting that appropriation in two means that the organization will have to be reduced and that a loss of efficiency will necessarily result.

I do not know that I can say anything more than that. On the basis of \$6,500,000 a year it will take at least 25 years to complete the needed forest roads and trails. If that is cut in two or cut at all the length of time required to complete these necessary facilities

will have to be extended proportionately. It is my personal judgment that a general plan of completing these needed facilities in the space of 25 years should be a minimum period and that we ought to adhere to that rather than to extend it. On the contrary, there is the viewpoint of the Director of the Budget as to what the Federal Treasury will stand, and, of course, I can not dispute that point of view.

Mr. ANDERSON. I recognize the fact that it is always a question of offsetting the needs against the money you actually have. I simply wanted to get into the record the full situation, so that the committee could act upon it intelligently from the standpoint of the whole program.

Mr. JUMP. In view of the question that has arisen about this item, would not this be the common sense thing for us to do: Between now and Monday have the department—Colonel Greeley, Mr. MacDonald, and myself—see General Lord and get a clearer understanding of what they had in mind. This authorization says there shall be appropriated for the fiscal year 1923, for the fiscal year 1924, and for the fiscal year 1925. I think the word “for” is the deciding factor. If it said certain appropriations are authorized “during” the fiscal year 1923, I think they would have construed it just as you have. We will go back to the Budget Bureau and see how they look upon the matter.

MONDAY, NOVEMBER 20, 1922.

BUREAU OF CHEMISTRY.

STATEMENTS OF MR. W. G. CAMPBELL, ACTING CHIEF; DR. W. W. SKINNER, ASSISTANT CHIEF; MR. H. S. PAINE, IN CHARGE OF CARBOHYDRATE LABORATORY; AND DR. S. P. VEITCH, IN CHARGE OF PAPER AND LEATHER LABORATORY.

SALARIES.

Mr. ANDERSON. We will take up this morning the Bureau of Chemistry, on page 171. Do you want to make any preliminary statements before we take up the statutory roll?

Mr. CAMPBELL. I do not think any statement is necessary, but I can make statements as we go along in connection with each particular item.

Mr. ANDERSON. Then we will take up the statutory roll, in which there appears to be a decrease of \$14,100.

Mr. CAMPBELL. This is due to the dropping of 20 places. The dropping of these places, of course, is the result of a concerted effort to manifest economy, in every way in the world we possibly can. Very naturally, in the development of an organization to meet current conditions, which are changing from time to time, we endeavor to make an arrangement by brigading the work in a fashion that will lend itself to the employment of the fewest possible men.

We have made a strenuous effort in that direction and have concluded we can drop 20 of the places that were provided for in the statutory roll of last year, and that will effect a reduction of \$14,100.

There is another change in that item. At the present time there is provision for nine laboratory helpers and for one skilled laborer at salaries of \$840 each. We have asked that these be placed under one heading and given as 10 laboratory helpers or laborers, without any change in salary at all. The purpose of that is to make it possible for us to get from the civil service register the type of man that might be required for some work which we have in the laboratories, and we can get more efficient men and men to meet the needs of laboratories in certain sections more readily if we do not have the two lists and can appoint them either as laboratory helpers or laborers.

Mr. ANDERSON. Are the places you have dropped now vacant?

Mr. CAMPBELL. Some of them are vacant now and all of them will be vacant we contemplate by the time this bill goes into effect.

INVESTIGATION OF APPLICATION OF CHEMISTRY TO AGRICULTURE.

The next item is for agricultural investigations. This is the appropriation out of which the fundamental agricultural chemical research work is supported. We have various lines of chemical activity in the field of agriculture paid from this fund. All of these projects of work are formulated and promoted, of course, with an eye to the underlying economic significance of them. I may say to you, and perhaps this would be the pertinent place to bring it in, that the work of the Bureau of Chemistry divides itself naturally into two primary subdivisions. The first is the research work or investigational work, and the second is the regulatory work, such as the enforcement of the food and drug act, as well as tea importation act. Now, the research work is of two types. First, that work which has to do with primary research in the field of agriculture looking toward cultural phases, and second, that work which has to do with the employment of chemistry in the solution of those problems which exist in manufacturing establishments utilizing agricultural raw materials. In other words, it is technological rather than cultural, but both of which have economic importance.

Some of the work in the technological field is supported by specific or particular appropriations. Those we will come to later. But all of the fundamental research work of a cultural kind, in which chemistry is employed in the whole agricultural scheme, is supported from this particular appropriation.

Those which have economic significance, illustrated in the most direct way, of course, are such undertakings as the utilization of agricultural waste materials for some beneficial purpose. That can be illustrated by the work which has been done in a study of classes of waste materials and their suitability and value for use as stock feeds. One of the laboratories in the bureau has been working on this thing for some few years, and bulletins have been published on the basis of materials which lend themselves to that use. Of course, you are familiar with the work we have done, more particularly in California, in the citrus fields and the utilization of cull oranges, products which formerly found themselves valueless and which, when they had a sale, would bring nothing more than approximately \$2 a ton but which are now being sold regularly and contracted for on the basis of something like \$30 a ton.

Mr. BUCHANAN. What use have you found for them?

Mr. CAMPBELL. We have found use for them in the manufacture of oils from the citrus fruits, the use of the peel of the fruit, in the manufacture of citrate of lime, citric acid, and also their employment where the fruit is of a quality to enable its use, in the manufacture of a base for marmalade. There are some several well-established factories in southern California as a result of the work we have done there.

Mr. BUCHANAN. What did you say was the difference between the former price of culled oranges and the price at the present time?

Mr. CAMPBELL. Formerly, when they had a sale at all, it would be about \$2 a ton, ranging from \$2 to \$4 per ton, while now it is, in round numbers, \$30 a ton.

VALUE OF RESEARCH WORK.

Mr. BUCHANAN. Do you attribute this exclusively to the research work of the Bureau of Chemistry?

Mr. CAMPBELL. Entirely, because these products had no virtue, no value at all; they represented a waste material.

The work we are doing now, through the laboratory that has been interesting itself in this matter, is that of determining some plan by which we can detect, before marketing, the extent of damage that may have been done by a freeze. Periodically the citrus-fruit growing sections of the country are visited by frosts, with the result that if the oranges are frozen there is eventual evaporation to a degree that renders that fruit unfit for food purposes. You will find it is absolutely dried up, but there is no indication of that fact from an inspection of the outside of the orange. Now, this evaporation does not manifest itself immediately. The freezing seems to produce a condition in the cell tissue of the fruit that brings about this drying out or evaporation frequently several weeks after the freezing has occurred. If that fruit could be put on the market immediately and consumed before this evaporation takes place there would be no objection to it, but if the producing industry ships that fruit and finds that by the time it gets to the Atlantic seacoast it has begun to evaporate it not only sustains a loss which would be visited upon it through the destruction of the fruit, but in has in addition the charges of transportation, packing, and shipping. Our effort now is to work out some way, if it is practicable, which will make it possible in this industry to determine, prior to shipment and promptly after the freezing, whether there had been a damage to this fruit that would warrant its destruction there or the withholding of it from markets as remote as the Atlantic seaboard.

Mr. BUCHANAN. You say you are not able to determine, under a specific temperature, that a particular freeze has been sufficient to cause evaporation. Of course, the farmer knows when there has been a frost.

Mr. CAMPBELL. He knows when he has had a freeze, but unfortunately, Mr. Buchanan, we find that these freezes are not universal. The cold temperature you will get in a certain section will not be reflected in the matter of the fruit that is produced in that entire locality. You will, in some sections, through a depression in the surface, find that the fruit will be very materially affected, while in a more elevated field it will not be affected at all. Now, the freeze

we had in California last year showed that this condition could be ascribed to certain localities, but that there would be points south of some of the frozen sections where there would be no freezing, and then points farther south where there would be, so that possibly the freezing or lack of freezing depends altogether on the depression and elevation of the land. But even where there has been a freeze, where they have had a fairly low temperature and there are indications that some of the fruit has been damaged, it does not follow that all the fruit on a particular tree or all the fruit in the grove will be damaged, and the question is the determination, as promptly as possible, of that which has been frozen, so that it may be eliminated.

The only thing that is being done by us to detect that condition now is the employment of a plan which was devised by the bureau based on the specific gravity of the fruit, but it is a plan which you can not employ until some several weeks have elapsed. That is just a flotation process, because after it evaporates it becomes lighter, so that the heavier oranges under this plan would go to the bottom while the lighter oranges would float off on top. But it takes time to do that; you have got to wait until after evaporation takes place, and that is merely a means of detection after the injury has already taken place.

Mr. BUCHANAN. You can do that as well by opening up your oranges, can you not?

Mr. CAMPBELL. Yes; but our experience is that if you take a box of oranges and cut into half a dozen of them and they run bad you can go ahead and cut 25 and they will run good, oranges taken from the same field and from the same section.

UTILIZATION OF BY-PRODUCTS.

There is also reflected in the plan of utilization of waste by-products, the work the bureau has done on corncobs. I think we have told you formerly of the progress we have made and how in that work we have found that corncobs will produce, in addition to adhesive, which seems to have commercial value, a product known as furfural; furfural is an article which lends itself to the manufacture of certain classes of products requiring a resinous base.

Furfural was an expensive chemical formerly, but the discovery of a supply of material from which it can be made will reduce the cost of it. It is now used in the manufacture of printing plates, phonograph records, and products of that sort. Our especial concern at this moment is the determination of just exactly the point at which the material can be used to the most economic advantage in the production of these two products, the adhesive and furfural.

We are also studying other classes of products, such as rice hulls, cottonseed hulls, oat hulls, and that class of material which lends itself to the recovery of furfural.

INVESTIGATION OF YAUPON AS A BEVERAGE.

Another type of work that is being done in this same line is the utilization of casina. I spoke to you last year about this in connection with a specific request for an increase in this bill in the amount of \$5,000 to undertake some experimental work on the use of casina for the purpose of manufacturing a beverage.

Mr. BUCHANAN. That is the yaupon work?

Mr. CAMPBELL. Yes; and I think you said that the discovery of any utilitarian purpose to which this could be placed would be a godsend to some of the southern States.

Mr. BUCHANAN. I said there was plenty of yaupon in the southern States.

Mr. CAMPBELL. Yes. We made an arrangement to establish a small experimental station near Charleston, S. C., and the work has been done in an extremely economical way because of our ability to borrow a lot of material that was required, and we found out that a very satisfactory beverage can be made from this. South America very largely uses yerba maté as its drink instead of tea. You take the Argentine Republic, and the supply of yerba maté is approximately 143,000,000 pounds. They produce themselves less than 2,000,000 pounds of that and they depend on the northern part of the continent for the remainder of their supply. Now, the utilization of casina, or the yaupon bush, as a beverage of the same sort as that used in South America has an economic significance which can be appreciated at once. Very naturally, there must be determined some plan by which that beverage can be made in an economical way. One of the reasons for the high cost of tea is the fact that the leaves are hand picked in a very careful way, and an attempt to manufacture the casina product or leaves into a foundation for beverage making, in a fashion comparable to the production of tea, is something which is entirely too costly.

Mr. BUCHANAN. You said they would treat them with steam and then they would break off?

Mr. CAMPBELL. That is right, and that is what we are doing, but if you treat them with steam an action takes place which prevents them from fermenting, so that what we have done with that condition is this: That by taking the small quantity of leaves which can be obtained by hand picking and running them through the rollers at the same time the juice that exudes from the leaves which have not been sterilized or steamed is sufficient to infect the whole that you run through the rollers, and thus you make possible the subsequent fermentation that is desired in order to put the material out in the form desired; it is actually being put on the market now in an experimental way.

LEATHER AND PAPER INDUSTRY.

Out of this same fund we are, in our leather and paper laboratory, giving consideration to the leather situation of the country. We recognize that there is a big field of work in fostering the more economic employment of leather and hides and the better utilization and preparation of these hides. The spread between the price the farmer gets for hides and the price at which he has to buy leather has been a matter of universal protest on the part of the farming industry.

In the last few years we have issued bulletins on the better treatment of hides; how to prepare them in a manner to get the maximum price for them, and also on the treatment and keeping of leather. There are several lines of work that ought to be taken up in connection with that. We recognize that in this country the supply of hides and leather is by no means adequate for our demands and that

the tanning materials themselves are insufficient. The laboratory has under consideration substitutes for tanning purposes, and also a study of the proper preservation of the leather. One of the things involved is the class of greases and oils that are used for stuffing purposes. The life of leather depends upon this stuffing, and its durability depends upon that. Furthermore, the problems of a chemical and physical kind involved in leather testing, as to durability and value which the leather possesses, is the basis upon which we control all of our other efforts and all of our other work.

WATERPROOFING OF FABRICS.

The same laboratory is now actively concerned in a consideration of the waterproofing of fabrics. These fabrics that are used in the nature of canvas for shock and hay coverings, for horse coverings, paulins, and the like, represent in their aggregate a very material expense to the farming industry. The same thing is true with respect to that section which uses certain types of fabrics for tobacco growing in certain areas. The outlay in money is considerable, and our concern has been to determine some plan by which these fabrics can be made both water and mildew proof and prolong the life of the articles. As an indication of the value of that work I may say that the War Department consulted our bureau in connection with purchases of fabrics such as we have in mind, and in one notable instance they called to our attention a saving of \$24,000 that was effected in a single purchase, not mentioning at all the advantage they get out of the material by reason of more intensive service; that is, its increased durability.

STUDY OF DIFFERENT TYPES OF PROTEINS.

This fund also supports the work in our protein laboratory. The protein laboratory is concerning itself with the study of different types of proteins. We know that one of the essentials for animal tissue is nitrogen, and that they get this only through the proteins they take in the form of their food. Formerly it was believed that all proteins served the same purpose, but we have shown that is not true at all. The work of the laboratory has demonstrated that there are different types of proteins and that some of them are lacking in certain amino acids of which all proteins are supposed to be composed. We found with respect to corn that two of the essential acids are lacking, and that if fed on corn exclusively an animal will not thrive and not develop as it ought to. The advantage of this is that it gives knowledge as to the defects in certain types of foods and also knowledge as to the particular types of proteins out of which these defects can be supplied. If you take a corn product and supplement it with soybean meal or peanut meal, you will have a completely balanced food.

There is a tremendous field for development in this direction and also in the employment of certain types of our own vegetable oils, the fostering of a more intensive use of them and a study of their chemical compositions. That, and the fundamental work we have under way on crop chemistry, questions to which Doctor Skinner, the assistant chief of the bureau, has been giving his particular attention, I would like to have stated in a brief way by him, with your

permission. I want to have him point out the significance of this work, because we are asking for an increase of \$22,500 in it, which, in the aggregate, will make a small appropriation for the support of the various lines of work we have under way, especially when you recognize the scope of the field in which this work should be carried on and consider the fundamental economic significance of it. Doctor Skinner, will you make such a statement?

DEVELOPMENT OF THE WORK OF THE CROP CHEMISTRY LABORATORY.

Doctor SKINNER. A part of this increase will be used in the development of the work of the crop chemistry laboratory. This work contemplates a careful study of crop composition and is made desirable and necessary by recent developments in agricultural chemistry, and particularly in nutrition, by which we have been made aware of the significance of some things which have been overlooked in the composition of crops, such as the recently discovered vitamins, and the character and composition of the proteins to which Mr. Campbell has just referred, and also our greater appreciation of the significance of some of the inorganic materials contained in crops, such as iron and calcium. Heretofore research work in agriculture, especially in agricultural chemistry, has been aimed very largely toward increased production and without a thorough appreciation of the necessity for an understanding of what I should like to term the quality basis, rather than the quantity basis, of crop production, using the word "quality," in the sense which I have tried to indicate; that is, the fundamental character of the material used in its relation to nutrition.

It is rather difficult in work of this kind to prophesy or indicate its economic significance, but such work is basic in its character and may be the determining factor in great economic developments. One thing we have in mind to do in this laboratory as illustrating the possible economic significance is this: There is a prejudice in Europe against American corn. It is believed that the flint corn, which is grown so largely in South America, particularly Argentina, is of more value in feeding than our softer varieties of corn. One of the reasons, perhaps, is that in Europe practically all of the corn is used very finely ground, while in this country we use a great deal of corn unground or cracked. But there is that feeling that our corn is inferior. In Spain, if my memory serves me correctly, only about 10 per cent of the imported corn comes from America, the remainder coming largely from Argentina. Therefore we need to make a study to determine, first, if there is any real basis for the alleged superiority of the flint corn over our varieties of corn. If that is found to be true from this research work, then it behooves us either to develop a better strain of dent corn or to undertake the production of a larger amount of flint corn, especially for the export trade. If it is found that there is nothing in the alleged superiority of the flint corn, then it will be necessary to undertake educational work to support a propaganda to increase the export of corn, based on actual experimental and research determined facts.

Another portion of the increase which has been asked for will be devoted to the work of the protein laboratory—that is, in expanding that very important work. Mr. Campbell has already touched upon that. The work done by this laboratory is the very basis of a clear understanding of the needs and the development of rational

methods of feeding. For years we have regarded the three large components of food—i. e. fats, carbohydrates, and proteins—as having certain well-defined significance, and rations have been built up, and textbooks have been written on the subject of nutrition, based on those three proximates of food materials. It is only within recent years that it has been determined that all proteins are not alike; that they vary greatly in the value of the amino-acids composing them, but nothing has been done in an attempt to grow crops of specific protein content.

RESEARCH WORK IN OILS.

Another phase of this research work has to do with oils. Here we can point with some definite significance to the results of research work in an economic way. A good many decades ago cotton seed was almost a waste product, but finally methods of refining cottonseed oil were worked out by the chemist, and there was made available a great source of fat for human consumption. Back of that, however, there had been research work done looking to the substitution in some of the organic acids of certain chemical elements which would change the character of the product.

The chemist who first determined that hydrogen could be injected into a molecule of oleic acid, thereby changing it into stearic acid, made it possible to change an oil to a solid fat. The significance of that was not apparent when it was done, but that very thing has been worth hundreds of thousands of dollars to agriculture in this country and especially the agriculture of the South. According to the latest statistics I have, one firm, that puts out Crisco, manufactures annually, or did in 1916, 60,000,000 pounds of hardened fat, based on this chemical investigation, which made it possible, through a proper chemical reaction, to make liquid fat into a solid material which could be used for shortening purposes. Of the approximately 1,400,000,000 pounds, according to the latest statistics we have, of crude cottonseed oil, about 80 per cent is now used, either directly or indirectly, in the hardened fat preparations. This has added materially to the wealth of the Nation, and particularly to the wealth of the South, hundreds of thousands of dollars.

STUDY OF THE LOSS IN HANDLING CRUDE COTTONSEED OIL.

Another project which we wish to expand is a study of the refining loss in the handling of crude cottonseed oil. The unsaturated compounds of the cottonseed oil would theoretically account for a refining loss of only about 2 or 2½ per cent, but, as a matter of fact, it is nearly 10 per cent, due to the fact that there are certain physical and chemical difficulties in the matter of refining that have not yet been solved. If we could reduce the refining loss 5 per cent, indeed; if we could reduce it only 1 per cent, on the basis of 1,000,000,000 pounds of cottonseed oil, the economic gain would be enormous.

These are three of the main projects, on which, if this increased appropriation is allowed, we propose to concentrate. Our plan has been to concentrate on those things which seemed to have the most important economic significance, and I think this statement perhaps covers sufficiently the three projects which we propose to expand.

CARBOHYDRATE INVESTIGATIONS.

Mr. ANDERSON. I notice that you are apparently abandoning the work of the carbohydrate investigations?

Doctor SKINNER. No; Mr. Campbell will explain that.

Mr. CAMPBELL. There is a special appropriation for the work of our carbohydrate laboratory in connection with the manufacture of sugars and sirups, which we will come to under the particular items later on. The carbohydrate laboratory has been giving its attention, largely, to two classes of conditions. First, that which involves agricultural research primarily on carbohydrate products, and, second, the study of industrial problems with which the manufacturer is concerned in the utilization of agricultural raw materials, such as in the manufacture of cane sirup and the manufacture of sugar itself. Recently the work of the laboratory has been directed in an intensive way to some of the technological industrial problems because of the urgency with which a need for their solution was presented. Our force has taken that up actively and has studied on, that to the exclusion of other lines of work in the belief that we could solve those problems in something like a year. So we suspended action, temporarily, on the strictly agricultural research in the carbohydrate field and employed our force on the technological matters.

If the appropriation, however, is not sufficient to make possible the study of technological problems in the way we had in mind, very naturally, a rearrangement of that project will be effected for the purpose of continuing the basic agricultural investigation which is now supported out of the agricultural investigational fund in a part of the carbohydrate laboratory.

COLLABORATION WITH OTHER GOVERNMENTAL DEPARTMENTS.

The next item is for collaboration with other departments of the Government desiring chemical investigations. The Bureau is called on in a great many ways to do work for other departments. The greatest amount of work we had to do was during the period of the war, when there was such a heavy demand on the part of the Army, the Navy, and Marine Corps for the examination of supplies of food that were being purchased. While that demand is not existent now, the variation is in degree only, because we do consult with them with regard to the specifications they issue as a purchasing basis and then make examinations of the food upon delivery to see whether or not they comply with those specifications and the terms of the purchase contracts.

COOPERATION WITH POST OFFICE DEPARTMENT.

In addition to that we are working with the Post Office Department in the enforcement of their postal fraud laws as those laws relate to patent medicine preparations particularly, handling those matters from the standpoint of the use of the mail for the purpose of effecting their sale. Most of this money, in fact, goes for that very purpose, the Post Office Department recognizing that it is not equipped to give consideration either to the chemical composition

or to the extent to which there was fraud involved in the therapeutic claims made for certain preparations and, therefore, the Post Office Department has called upon the Bureau of Chemistry for assistance in this work. We have appreciated that it was an undertaking sympathetic with the purposes of the food and drug act itself and we have used the biggest portion of this fund for that.

INVESTIGATIONS OF RAW MATERIALS FOR COLORING, ETC.

The next item is for the investigation and experiment in the utilization for coloring, medicinal and technical purposes, of raw materials grown or produced in the United States. This is the fund that supports the work of the color laboratory. This appropriation was asked at a time when the department or bureau undertook to assist the color manufacturing industry in this country by a determination of methods by which it would not only utilize the intermediates available but could, in fact, manufacture them and not be dependent upon foreign sources for that supply.

That work has changed in its character very materially since then. You know that some of the work of the laboratory has effected tremendous economy in the manufacture of some of these color products or the basic material from which they are made, such as phthalic anhydride, and its attention, instead of being given now so much to the question of tonnage production, as was the case originally, is being directed to some special phases of color work which the industry itself is not taking up. One of the greatest difficulties confronting the industry in color manufacture is some means by which there can be a definite and correct identification made of colors. It is essential to make that study from the standpoint of art and the value of those colors for dyeing purposes. We have been working in the past year upon methods of identification by which, upon proper analysis, definite colors could be identified and the extent of the impurities made known.

INVESTIGATION FOR A STABLE BIOLOGICAL STAIN.

In addition to that we have also been giving particular attention to a concern which has been manifesting itself on the part of the scientific world, and that is for a stable biological stain. This biological stain is used by bacteriologists, pathologists, physicians, and veterinarians in staining, studying and identifying disease-producing organisms.

That particular stain was derived exclusively from Germany before the war. The firm that manufactured that stain went out of business as a result of the war, and, as a matter of fact, it is not being manufactured at all now. It is no longer available, and because of the fact that it is not a tonnage proposition, it is a question that does not in itself appeal to color manufacturers. But the replacement of that particular stain or the determination of some other stain that will answer the purpose is of the utmost importance to the scientific world. The Bureau of Chemistry, in cooperation with scientific agencies that are undertaking to test out the fabricated dyes for this purpose, is now trying to determine some stain that will answer that particular service.

MANUFACTURE OF SYNTHETIC THYMOL.

There is another thing that is coming up in connection with the work of that laboratory that I may refer to here and that is the employment of cymene, which is a waste material from paper factories, as a basis for the manufacture of synthetic thymol. Thymol is a disinfectant that has been used extensively by the medical fraternity in this country and it also has another significant use in the treatment of hookworm.

This product has been brought from abroad exclusively, but we have found it is possible to manufacture from cymene a synthetic thymol which seems to have every attribute that the product that we have heretofore depended upon possesses. Thymol now sells for about \$4.50 a pound and we calculate it can be made in this synthetic fashion for about \$2.50 a pound. When you consider that there are something like 2,000,000 gallons of cymene wasted each year in the paper factories of this country and Canada the economic significance of that is apparent. So that our line of work right now in this color laboratory is in specializing on matters connected with assisting color manufacturers in putting outcolors on a tonnage basis not only, but in giving consideration to those feature of color fabrication and color identification that are essential but which do not, on account of the smallness of the output, give any particularly inviting reason for manufacturers to engage in that study themselves.

INVESTIGATION OF METHODS AND MANUFACTURE OF SIRUPS AND SUGAR.

The next item is for the investigation and development of methods for the manufacture of table sirup and sugar and of methods for the manufacture of sweet sirups by the utilization of new agricultural sources.

We are asking for an increase in this appropriation. I told you last year of the work that our carbohydrate laboratory was doing in the South in fostering the use of invertase in the manufacture of cane sirup as a means of preventing fermentation, on one hand, and crystallization on the other. That work has been accepted with an enthusiasm on the part of the cane sirup producing sections that exceeded anything we anticipated. In fact, last year, you may recall, that the demand was so extensive that we felt it should be submitted to the department and the department, in turn, through the Bureau of the Budget, submit it to Congress. We took it up with Congress and you effected an even greater increase in that item to meet the emergency at that time. In addition to the work on cane sirup we are also studying, in an intensive way, some of the technological difficulties with which the sugar manufacturing interests of this country are confronted at the present time because of their failure to get a proper yield of sugar from the material out of which they are manufacturing it. You take, for instance, the beet sugar interests of the country, and outside of the State of California, and particularly in those sections where storage is necessary, there is a very decided diminution in the actual yield from what is the actual sugar in the product itself. That loss, which is borne jointly by the farmer and by the manufacturer—and incidentally, in this instance

the manufacturer himself is in most instances a farmer—has been variously estimated at from \$6,000,000 or \$7,000,000 to \$10,000,000 annually. We have been working on that problem in the laboratory and at this point I would like to ask, with your permission, Mr. Paine to make a brief statement with regard to it.

CANE-SIRUP INDUSTRY.

Mr. PAINE. The cane-sirup work has for its object the assistance of the cane-sirup industry in the South. At the present time sugar cane is raised generally throughout Florida, the southern part of South Carolina and the southern halves of Georgia, Alabama, Mississippi, Louisiana, and East Texas. Practically the sole use of sugar cane is in making cane sirup, outside of Louisiana, at the present time.

Mr. ANDERSON. You say that in these other states it is not used for making sugar?

Mr. PAINE. In Louisiana it is used in making sugar and sirup, while in the other States it is in general only used for making sirup.

Mr. BUCHANAN. They make sugar in Texas, do they not?

Mr. PAINE. A small amount.

Mr. BUCHANAN. Are not the biggest refineries in the United States in Texas?

Mr. PAINE. I do not think so.

Mr. BUCHANAN. One of the biggest, anyway?

Mr. PAINE. There is a large one, but I do not think it is the largest. At the present time cane sirup is made by a large number of farmers; it varies greatly in quality and has no stable and established commercial outlet; it has primarily only a neighborhood sale.

One of the objects of this work is to assist cooperative cane sirup associations in producing a uniform grade of cane sirup that can be sold through regular commercial channels. We are cooperating with the farm bureau federations in Texas and Alabama with the idea of assembling the sirup at central blending and canning plants for the purpose of mixing it to uniform grade and giving it sufficient treatment by the invertase process—which we have developed for preventing crystallization—and be able to turn out cane sirup of high and uniform quality.

High-grade cane sirup should have the following points of quality: Freedom from crystalization, clearness and freedom from dregs and sediment, and attractive color and flavor and standard density.

PLANT AT LUFKIN, TEX., FOR BLENDING, PROCESSING, AND CANNING SIRUP.

This is the psychological time to do this work, if it is ever going to be done; and if it is ever going to be done it will have to be through an organization of farmers, and it has only been in the past year or two that this has been made possible through farm bureau organizations. They have no facilities for the technical part of the work, and they have asked us to give them the necessary technical assistance. We have drawn up plans for such a central plant and method of procedure; and this first plant of its kind is now being erected at Lufkin, Tex., and is expected to be in operation in about two weeks.

Mr. ANDERSON. How large an investment do these plants require?

Mr. PAINE. This plant at Lufkin will require about \$25,000 capital.

Mr. ANDERSON. What would be its output, normally?

Mr. PAINE. They expect to handle about 300,000 gallons of sirup this year; this is expected to be increased later to 500,000 gallons.

Mr. ANDERSON. What would that be worth?

Mr. PAINE. They should get at present prices about 75 cents a gallon.

Mr. BUCHANAN. In this plant you are speaking of, is it for the manufacture of some substance to keep the sirup from fermentation and from solidification, or is it to manufacture sirup?

Mr. PAINE. The sirup is made by the individual growers, the farmers themselves.

Mr. BUCHANAN. I know, but what is the plant for?

Mr. PAINE. The plant is simply a blending, processing, and canning plant. The finished sirup is made in the customary manner by the growers, and the output of the individual producers is brought to this plant and mixed on a sufficiently large scale to give uniformity of quality, which they do not have now; it is then treated with invertase to prevent crystallization and finally canned.

Mr. BUCHANAN. This plant, then, crushes the cane to get the juice out of it and then boils the juice to sirup; and then you mix it?

Mr. PAINE. No; they have individual mills, just as they have always had.

Mr. BUCHANAN. The individual producers of the sirup bring it there?

Mr. PAINE. They bring the finished sirup there.

Mr. BUCHANAN. Then why could not this mixture, or treatment, or whatever it is, be made right at the mill that manufactures the sirup?

Mr. PAINE. Because the sirup varies in quality as made by these individual producers. The producer himself at his mill is not able to turn out the same quality of sirup constantly throughout the season, and no two growers produce the same quality of sirup.

Mr. BUCHANAN. Let us see about that a minute: You take this cane and crush it and get the juice out of it, and then you put it in the vats or pans and you boil it, and you have an instrument with which to determine the sirup-making point to which it should be boiled?

Mr. PAINE. Yes.

Mr. BUCHANAN. That instrument will determine that, if it is the same character of instrument in all mills?

Mr. PAINE. Yes.

Mr. BUCHANAN. You could boil it down to exactly the same density, I suppose you would call it?

Mr. PAINE. Yes.

Mr. BUCHANAN. And why would it not be the same?

Mr. PAINE. You get the same density, but you do not get the same quality, the same flavor and color, because the flavor and color of the sirup varies with the variety of cane, the type of soil it is grown upon, and the facilities available and care used in making the sirup.

Mr. BUCHANAN. Do you recommend a treatment of the juice through sulphur fumes to give it a uniform commercial color?

Mr. PAINE. No.

Mr. BUCHANAN. Do you condemn that?

Mr. PAINE. No; we do not condemn it either, but we do not think it is necessary.

Mr. BUCHANAN. You have seen it done, have you?

Mr. PAINE. Yes; I am thoroughly familiar with it.

Mr. BUCHANAN. You know that it gives the sirup a beautiful color?

Mr. PAINE. Yes. But a great many people do not like the flavor, and I do not think the chances are very great for extending the market for sulphured sirup.

Mr. BUCHANAN. Then it would cost \$25,000 to make one of these mixing plants. What do you do? In standardizing the sirup, do you boil it again?

Mr. PAINE. It is only necessary to boil it a little to bring it to the proper density, in case the density is not constant when delivered at the plant. But the principal object is this, to mix the sirup on a sufficiently large scale so that you get a uniform product which is constant in flavor and color. You see, by mixing on a large scale, you equalize all those differences in the sirup, as made by the large number of individual producers on a small scale. The cost of the plant is much less than \$25,000. I was referring to the capital required.

Mr. BUCHANAN. Can you not preserve the sirup from solidifying into sugar or prevent fermentation without all this standardization that you speak of?

Mr. PAINE. This process that we have developed, which is in use in a great many mills at the present time for preventing crystallization, can be used, if desired, at the mill where the sirup is made.

Mr. BUCHANAN. You say "for preventing crystallization." How about fermentation? That is more important than crystallization.

Mr. PAINE. We prevent fermentation indirectly by making the sirup thick. The thick sirup will not ferment as readily as thin sirup, but the thick sirup would crystallize almost solid if it were not treated by this method.

Mr. BUCHANAN. But you prevent the sirup souring by making it thick, and then adopt a method to prevent crystallizing into sugar?

Mr. PAINE. That is the point.

Mr. SKINNER. That is accomplished by the use of invertase. This thick sirup would crystallize.

Mr. BUCHANAN. I know that; I used to make sirup.

Mr. SKINNER. This is a method for preventing that.

Mr. BUCHANAN. I see. What do you get this invertase from and where do you get it?

Mr. PAINE. We make it from beer yeast, a by-product of manufacture of near beer.

Mr. BUCHANAN. A man could not have that thing in stock, could he? [Laughter.]

Mr. ANDERSON. Is there anything further on this?

Mr. PAINE. I want to explain why the invertase is used at the central plant. This is because we are going to assemble all this sirup there, anyhow, to mix and can it, and that is the cheapest place to use the process.

Mr. ANDERSON. How large a production area will a plant of this size take care of?

Mr. PAINE. It is a question of transportation costs.

Mr. ANDERSON. That is whas I am getting at.

Mr. PAINE. They are trying to get a refining-in-transit rate. They expect to get that in Texas, and that will facilitate matters greatly.

Mr. BUCHANAN. Is it possible to take this invertase and use it at a little mill in manufacturing this sirup and preserve the sirup?

Mr. PAINE. Yes, sir; they can do that. A great many mills are using it that way.

Mr. BUCHANAN. That is the practical way, and it is the only practical way.

Mr. PAINE. I want to say this, however, that I am convinced that the only salvation for the cane sirup industry is through concerted action of organizations of farmers who will get together and furnish a sufficiently large volume of uniform sirup to create a stable commercial outlet. If they do not do that, there is nothing to be hoped for, so far as extending the market for cane sirup and increasing the acreage of sugar cane is concerned.

Mr. ANDERSON. I think you are quite right. A man will go down to the grocery store and he will buy some cane sirup. It does not taste just right. Then he will go down and get another can and it is all right. But once he gets one of these cans that is not right, he will quit buying that kind of sirup.

Mr. BUCHANAN. Of course, if you want to pay for sirup produced at a little mill and ship it to a central plant and remanufacture it in order to get everything tasting just right—if you are willing to pay for that, go ahead. But I am talking about the practical part of it now.

Mr. PAINE. I think that is the most important part of this matter, really. In talking to farmers in Texas, a number of them told me that they would rather extend their acreage of sugar cane than that of any other crop they grow; that if they can get a reasonably stable return, there is more money in it than in any other crop they make. If they grow 1 acre or so they can sell the sirup to the neighborhood market and there is no trouble, but if a man wants to grow 20 or 50, or perhaps 200 acres as one man told me, he has got to have some stable commercial outlet, and he has got to sell through established commercial channels. There are a great many people who want to extend their acreage of cane. There are large areas of cut-over pine land in southern Mississippi, northern Florida, southern Georgia, and Alabama where the lumber companies are trying to find some good crop to grow on that land. They are paying a great deal of attention to sugar cane at the present time. There is a tendency to increase its acreage.

But what is the use of trying to increase the acreage of sugar cane or bother about the problems of growing it unless you can sell the sirup? And you can not sell it successfully unless you can create a uniform article, and if you have not a stable, uniform article you can not sell it to consumers through established commercial channels. That is the key to the whole thing.

Mr. ANDERSON. That is the trouble, as I apprehend, with the whole agricultural situation—producing something that nobody wants.

Mr. BUCHANAN. The trouble with us was that we could not sell it down home, and the thing would not keep; it would either become sugar or sour.

Mr. SKINNER. This method is going to prevent that.

Mr. BUCHANAN. If there were two or three cold months, it would keep, but just as soon as the weather got warm it would ferment or sour. That was the trouble with us.

Mr. SKINNER. We have solved that problem.

INVESTIGATION OF BEET SUGAR.

Mr. CAMPBELL. Won't you say something, too, about the work at the beet-sugar factories, because that is one of the serious problems we have to concern ourselves with. Tell something about that, since we are asking an increase on this item.

Mr. PAINE. This is regarding the waste in production of beet sugar after the beet crop is made. After the full expense of raising beets has been incurred there is a loss of something like \$10,000,000 annually in destruction of sugar or failure to recover sugar. A considerable part of this loss is in failure to recover sugar efficiently from final molasses. In making cane sugar they do not recover sugar from final or exhausted molasses. In the beet sugar industry they use such a process and if the process they use were perfect there would be no molasses; in other words, after recovering all the sugar from beet molasses which can be obtained by crystallization the remaining sugar can be extracted by a chemical process. In parts of California the process used is practically 100 per cent efficient. In other parts of the country there is a big loss which is due to the fact that the sugar beet does not fully mature in hardly any section of the country except southern California; also, it is stored in other sections. They must harvest the beets faster than the factory can use them in parts of the country outside of California, and pile them up, and they undergo deterioration in storage.

There is a loss during storage of some 10 per cent of the sugar in the beet, which is lost while they are piled up. This also unfavorably affects the process of recovering sugar from molasses, so that the factories are only able to utilize about 65 per cent of the molasses for recovery of sugar; the other 35 per cent has to be sold for whatever it will bring. The latter has formerly been used very largely in the manufacture of mixed stock feeds.

Mr. BUCHANAN. In other words, they are getting only a certain per cent of sugar out of the beet now, when they ought to get a great deal larger percentage?

Mr. PAINE. That is it exactly. As long as they got a pretty good price for molasses for stock feed it did not make so much difference, but the price now is largely nominal and some of it can not be disposed of at all. We have been studying this problem and have been making considerable progress. We hope before long to have the means of making the process practically 100 per cent efficient.

Mr. ANDERSON. If you have got to store these beets you can not stop that, can you?

Mr. PAINE. I am referring to the recovery of sugar from molasses. Of course, they have got to store the beets. The only thing they can do there is to learn more efficient methods of storage and reduce the loss there as much as possible.

Mr. CAMPBELL. There are some beets grown under certain conditions that lend themselves to storage without as much loss as other types of beets in other sections. We have already made specific

recommendations which will obviate the loss due to the storing of beets indiscriminately. This work has been directly under the supervision of Mr. Paine. They have been concerning themselves particularly with the removal of those impurities that are in beets or in the molasses as a result of the deterioration of the beet through storage which prevent crystalization. The solution of that question is a complicated industrial chemical problem.

We have made splendid progress on it. We have made application for a public service patent, and we are expecting to effect arrangements by which the results obtained on a laboratory scale can be worked out in actual factory production.

FOR ENFORCEMENT OF THE FOOD AND DRUGS ACT.

Mr. ANDERSON. We will now go to the next item.

Mr. CAMPBELL. The next is the appropriation for the food and drugs act, page 178. We are asking for an increase in that appropriation, Mr. Chairman. I stated to you last year that while we were asking for no increase at that period I foresaw that the appropriate representative of the bureau would come before and ask very early for an increase in the fund.

The enforcement of this law is getting more difficult and more expensive every year. That is naturally to be expected. The conditions with which we are confronted at the present time in its enforcement are quite different from those that obtained originally.

The forms of sophistication that exist now are more subtle and more devious than those that were originally encountered. The enforcement of the law does not involve the simple mechanical operation of going out and collecting a sample and showing that it had been shipped in interstate commerce and in making a simple examination to prove that the product claimed to be in that package was not that product at all. Proper enforcement now requires thorough study to determine methods which can be employed by these laboratories engaged in the simpler form of work, for the purpose of identifying the type of adulteration that has taken place. It is necessary, in those circumstances, to devote some of this fund to the laboratories that we designate as staff laboratories in the bureau, which are giving concentrated study to these types of adulteration and to the question of evolving some method by which, upon the examination of an objective sample, this form of adulteration can be detected.

Of course, that is no simple and no easy matter. And to the extent that we employ money for that purpose in carrying on those various studies which are essential and which form the basis upon which all of our work depends, to that extent we withdraw from the active field operations funds that would otherwise be spent in the employment of inspectors and analysts to be stationed in our branch laboratories. We have a very material depletion in force, from the standpoint of field activity. We have now less than 40 inspectors where we formerly had a staff of 51 inspectors. The force, as a matter of fact, if we are to maintain the same standard of efficiency in our operations, should be increased in proportion to the increasing difficulties that we encounter, but the converse of that is true now.

INSPECTION OF IMPORTED FOOD AND DRUGS.

In addition to looking after the domestic traffic we are required also, as you know, to give attention to importations. The law applies to both import and export traffic.

Since the war we have had really more work to do than we had at any time previous to that, without regard at all to the volume of food imported into the country. Before that time there had been something in the nature of a classification or standardization in certain classes of food products in certain sections of foreign countries from which they came. But that was torn to pieces during the period of the war, and we have found products that seemed to be made formerly in an unobjectionable way being offered for entry in this country with entirely different composition from that which we originally knew.

So the work really has increased very materially from the standpoint of import control. We are not able to meet the situation at all with our present force, and I do not pretend to say that we will completely meet it at all if we are granted the increase that is asked here.

I told you last year of a visit that we had received from a committee of importers representing the import trade in New York, who had come to Washington for the purpose of seeing you and the corresponding committee in the Senate to ask for an increase to this appropriation, to be applied specifically to the New York field, to increase the force and the facilities there for doing our import control work in a more expeditious way. After we explained the circumstances to them they went back to New York. But the industry realizes the situation and has dealt with us in a sympathetic way on the score of our limitations.

It is a serious thing when you effect delays in import products particularly. You take the congested sections in New York, where they do not have adequate storage facilities under Government supervision, and it is only a very short time until the demurrage will eat up all of the importers' profits. So it is imperative that such action as we do take be taken promptly if we are to give any consideration at all to the welfare of the trade; and we do this by using our judgment, in so far as our experience will permit, in discriminating in the class of products that we give attention to.

MAINTENANCE OF LABORATORIES.

It is necessary to maintain laboratories at certain of the ports of the country for the purpose of expeditious consideration of import shipments. The overhead is fixed and definite. But up to the present time we have not the operating funds to make our activity economical, because it is not at all adequate from the standpoint of our existing overhead. If we get this money that we are asking for here our purpose is to employ it in bringing the force up to something approaching normal, by the appointment of additional inspectors and additional chemists.

INSPECTION OF IMPORTED FOOD AND DRUGS.

Mr. BUCHANAN. Do you inspect food that is shipped in here?

Mr. CAMPBELL. Oh, yes; imported in here.

Mr. BUCHANAN. How extensively do you carry that work on?

Mr. CAMPBELL. We should do it with respect to every importation that is brought in, but we can not do it. The law itself provides that the Secretary of the Treasury in his consideration of products from the standpoint of the assessment of duties shall deliver to the Secretary of Agriculture samples upon request of the latter for examination.

When this is done, if our examination shows the product to be adulterated, we report that fact to the collector of the port, and state to him that it is in contravention of the Food and Drugs Act, and recommend detention of the shipment. But we should do it with respect to importations of foods and drugs at every port in the country. That, however, is a physical impossibility, and could not be done if the fund appropriated were multiplied several times, when you take into account the entries of all of the border ports, not only on the seaboard but on the Canadian and Mexican borders. We do have in cooperation with the customs officials what we think is a sufficiently well established plan to permit fairly reasonably adequate control of the importations of all types of foods and drugs.

Mr. BUCHANAN. You merely have an understanding, then, with the customs officials at certain ports that if any commodity looks suspicious to send you samples?

Mr. CAMPBELL. Our men go to the ports and they attempt to teach them. As a matter of fact, we attempt to train the customs official into a food official. You take a port, for instance, in the nature of New Orleans, or, say, Galveston, and that port will have several subports of entry, according to the customs scheme of territorial division. The officer that will be stationed at the Mexican border points, for instance, will report to this collector or officer at Galveston.

We endeavor to have our laboratories established at points where the collectors themselves are located, and through their deputies arrange for appropriate supervision of all importations of foods and drug products at these subports, and if they themselves realize the condition of the kind we have described to them they forward samples to us and hold up the shipment and we make the examination.

FOR ENFORCEMENT OF ACT TO PREVENT IMPORTATION OF IMPURE AND UNWHOLESOME TEA.

The next is the enforcement of the import tea act. This act and the body enforcing it was transferred from the Treasury Department to the Agricultural Department about two years ago, I think. Forty thousand was the amount that was appropriated at the time it was in force in the Treasury Department.

We are asking for an appropriation of \$38,000, which is the amount we had last year. We are using that organization fairly well intact, attempting to brigade it with our food and drug organization so as to make the work between the two, as far as it is possible to do it.

less expensive than would otherwise be the case if they were working independently.

Mr. BUCHANAN. Are you finding any impure imported tea?

Mr. CAMPBELL. Oh, yes; we found more impure imported teas this last year than perhaps has been found in some dozen years.

Mr. BUCHANAN. Does any of it have any injurious effects upon the human system?

Mr. CAMPBELL. No; we can not say that, Mr. Buchanan; and examination really has not been made with that in mind. You know the tea import act is an extremely arbitrary law. It gives the authority for the creation of standards of different types of tea, and a tea that does not compare with this standard which has been agreed upon and set aside either from the standpoint of the impurities it possesses or from the standpoint of the cup quality it has is not permitted entry. So the work really is on that basis.

NAVAL STORES INVESTIGATIONS.

The next is the item covering investigation of grading, weighing, handling, transportation, and uses of naval stores, definite type samples thereof, etc., and we are asking for no increase on this item. This is an item which represents something in the nature of continuous work. Doctor Veitch, who is chemist in charge of our laboratory having to handle that particularly, I would like to have make a statement of a few minutes' length to you on that, so you can appreciate in a general way just what we are doing.

Doctor VEITCH. Mr. Chairman, perhaps I can best illustrate this work by this statement: About a month ago we were asked to join with the Turpentine and Rosin Producers' Association in the inspection and study of a big lumber plant in Alabama, which for several years had not been making much money on turpentine and rosin. A party of us went there and spent about 24 hours on the job, and we reached a unanimous conclusion that due to faulty methods of operation that company had failed to make about \$24,000 that it could have made with good up-to-date rational methods of operation and at a cost of approximately \$4,000.

That condition exists very largely throughout the turpentine-producing belt. Many operators are in exactly the same condition, and we propose to be in a position to help them to eliminate these uneconomic practices, to prevent their losses at the still and in the woods, and to bring their production methods and manufacturing methods up to the practice of the best operators. That will save a considerable amount of money to the producers.

On the other hand, Mr. Chairman, we are constantly having problems presented to us in regard to the use of turpentine and rosin. You doubtless know rosin is being more and more largely substituted for fossil resins in the manufacture of varnishes and paints. This is due to the fact that these resins are becoming scarcer and higher priced, and we are learning to use rosin more successfully, modifying it to take the place of these resins with better results. But every once in a while somebody hits a snag, and they think that perhaps we can help them out. Here is an example of such a problem [illustrating samples of varnish to the subcommittee] that has come to us recently. Here is the normal varnish, for instance, that should be produced

with a normal rosin, but when the paint manufacturer undertook to make a varnish in accordance with his usual practice from a shipment of rosin this is what he got [exhibiting another sample of varnish], and so he asks us to try to help him solve that problem. We have not quite done that; we are on the road to it. I am just bringing this up to show you the class of problems that are constantly coming up. That fact right there [indicating] injures the sale of rosin. It injures the utility of the rosin to the manufacturer and to the user of the varnish. A varnish made like that would not be of any use; it would crystallize right out.

So, Mr. Chairman, just along these lines—of increasing our production of rosin and turpentine, preventing losses, demonstration work in the South, and in eliminating some of the problems in the production is the way we hope to continue this work. Furthermore, we have got this question of adulteration and misgrading which we are still finding is exceedingly extensive. We must keep the types of rosin which we have devised in perfect condition all the time.

Mr. ANDERSON. Is there any legislation now which authorizes the establishment for a standard for rosin and turpentine—any method of enforcing the adherence to standards?

Mr. VEITCH. No, sir. This item permits the Secretary to devise standards and types for rosin, but they can not be enforced under it. They are only adopted by courtesy of the industry. The industry has approved them and is using them steadily, but it can drop them to-morrow if it wants to.

ADULTERATION IN MANUFACTURE OF TURPENTINE.

Mr. ANDERSON. Is there much adulteration by firms manufacturing these products?

Mr. VEITCH. It is increasing, Mr. Chairman, due probably to the very high price of turpentine. Turpentine to-day is around \$1.50 a gallon in the South. By the time the individual user buys it, he pays around \$2 or more a gallon for it. That stimulates adulteration with stuff costing 20 or 30 cents a gallon, and I am sorry to say that it is increasing some in the South, but I do not think it is increasing in the South anything like it is in the paint-using districts. In some States I have found, in asking for turpentine, that I have been delivered mineral oil straight, without a bit of turpentine in it, under the name of turpentine, and other places when I inquired into the matter it was stated that prices were so high that turpentine was driven off the market. Adulteration is helping to do that, of course.

PAYMENT FOR SERVICES RENDERED INDIVIDUALS AND COMPANIES.

Mr. BUCHANAN. When you go out and undertake the assistance of the private individual or corporation, do they pay any of the expenses incident to such help?

Mr. VEITCH. They have not. They have offered to do it, Mr. Buchanan. I do not see how we could receive it. We have no real authority to receive it, and we have done this with no real authority here as a matter of investigation. We are trying to show what can be done to improve pro-

Mr. BUCHANAN. This very appropriation says "in cooperation with the individuals and companies," and I was just wondering if they ought not to pay for that service. You render them a valuable service when you go there individually and supervise it and demonstrate it. I do not mean that in getting out any information or bulletins they should pay for that. But when you go there personally, or some of your men do, you supervise it and you render a very valuable service to them. It looks like they ought to bear the expenses of that trip.

Mr. CAMPBELL. Mr. Buchanan, it would be interesting to determine just what would be an equitable charge in that matter. We appreciate that under the authority you have given us and the money you have appropriated for the support of that work that a study of existing conditions is imperative on our part, and when we do that it is more from the standpoint of the study of the condition of the industry as a whole than in respect to some particular individual. Naturally, you can not get a knowledge of the condition of the industry as a whole without taking into consideration the aggregate as it exists on the part of individuals. And in doing that, we have been following out what we thought were the specific purposes underlying this special appropriation and were not disposed to consider a charge.

I daresay that the work that has been done is of sufficient interest to the industry as a whole that the industry in most cases would be willing to incur the expenses of our service, especially after the service had been performed and they appreciate the benefit of it to them.

Mr. BUCHANAN. Would you have any authority under the existing law to make any reasonable charge?

Mr. CAMPBELL. We do not think we have.

Mr. BUCHANAN. There is no reason why they should not pay a little, at least, for what valuable services they receive.

Mr. CAMPBELL. Of course, that is a matter entirely for Congress.

Mr. VEITCH. Nearly all producers who need this help are small and can not well afford to bear the expense. The work is practically farm demonstration work for the turpentine farmer. We have had this proposition presented to us within the past two weeks, Mr. Buchanan. I have seen a specification that was drawn concerning the purchase of rosin, and without our knowledge of it, that stated: In cases of dispute concerning the grade of this rosin, it shall be submitted to the Bureau of Chemistry, and the findings of the Bureau of Chemistry shall be regarded as final, and the party at fault shall pay such charges as the Bureau of Chemistry may make for that work. The question with us is, Have we any authority to make such a charge?

Mr. BUCHANAN. We have that being done in some other departments.

Mr. ANDERSON. There are several acts under which inspections are made or arbitrations performed, in which one department or another

is some shipping act in respect to the con-

company receives services of the Government to pay a little part of the expense.

INSECTICIDE AND FUNGICIDE INVESTIGATIONS.

Mr. CAMPBELL. The next is the item for investigation and development of methods of manufacturing insecticides and fungicides. The work under this item has been devoted to a study of the conditions found to exist in commercial insecticides and fungicides that are on the market now. Certain classes of insecticides and fungicides or disinfectants have been tested against a certain organism, upon which the standard of that product would be gauged. Very naturally we have been curious to know whether or not it would be equally effective against other classes of insecticidal or fungicidal attack and to determine whether or not the standard serving as a basis for the estimate of the value of this product applied with respect to its application to all classes of organisms, and we found that it has not been so in some cases.

We have also found this, that in the class of nicotine products, for instance, the packages containing them seemed after a while to lose their potency for insecticidal use; after a while they did not seem to possess the strength or the value that they were claimed to have originally, and we found that there was a deterioration in the product itself, under certain conditions, and gave attention to the methods under which the products should be prepared in order to maintain their potent condition for a protracted period of time.

The work of fundamental importance under this appropriation very naturally is to try to find some type of an insecticide or fungicide that will be effective in destroying the parasites but at the same time work no injury to the plant itself or to man or animal in the application of them and at the same time have the advantage of being cheap; that is the ideal product.

Mr. BUCHANAN. It is rather a hard job, too.

Mr. CAMPBELL. It is rather a hard job. It is something that can not be done in a minute, but, nevertheless, we are working on that, and we do have right now under way the study of certain compounds of a chemical kind that bid fair to supplant certain types of insecticides we have had, particularly nicotine products, that will have the advantage of being as potent as the nicotine product itself and at the same time very much cheaper.

After you work things of that sort out on a laboratory scale very naturally you have to determine from the standpoint of the cost involved whether it is a practical proposition to do it on a commercial scale.

INVESTIGATION OF CALCIUM ARSENATE.

We have just had this experience recently in connection with work that was done under this fund. Calcium arsenate, you know, is being manufactured and shipped extensively into the South for the purpose of combating the boll weevil and it has been found that different shipments acted in different ways; in other words, the water-soluble arsenic that was found present has been sufficient to burn the plants in a great many cases, and one of our men from the laboratory made a study of that situation in the South. He found that it was not altogether climatic conditions that were responsible for this excessive water-soluble arsenic, but it appeared that some of the mineral properties which the plant itself had exuded and were found to be in

the dew seemed to accentuate the development of water-soluble arsenic or that condition which is responsible for the burning of the plant.

That opens up a fundamental consideration that we had not particularly thought of heretofore, and that is that certain plants themselves through individual idiosyncrasy will cause certain types of insecticides or fungicides, that may have been heretofore considered as having a comparable or standardized effect on all classes of plants, operate in different ways on different plants.

Our work on this has been done in a limited way only. It has not been developed sufficiently to speak with finality about it.

FOR WOOL-SCOURING WASTE INVESTIGATIONS.

Referring to the item on page 188 for the investigation and development of methods of utilizing wool-scouring waste: At the time this was formulated, it did not appear that we would be able to complete that work by the 30th of June, but since the formulation of this estimate we have found that we could get the work through within that time, and the department has asked the permission of the Bureau of the Budget to withdraw this in its entirety.

Mr. ANDERSON. We will withdraw it for you.

FOR THE STUDY AND IMPROVEMENT OF METHODS OF DEHYDRATING MATERIALS USED FOR FOOD.

Mr. CAMPBELL. The next item, page 186, for the study and improvement of methods of dehydrating materials used for food. That work is continued in attempting to determine the technological problems involved more particularly with reference to the dehydration of vegetables. The work very largely in the past has been done in connection with fruits. The work has been concentrated in one laboratory, and that laboratory is the citrus-products laboratory in Los Angeles, Calif. We have made arrangements that will make it possible to obtain the fruit at little or no cost. The attempt was for the purpose of studying the best methods for dehydration and to get concerns that were interested in having products dried to purchase those products, furnish us raw material, and let us turn over to them the finished article, so that we could make our study in that fashion without the expense involved in the purchase of the material ourselves and attempting to market that afterwards, which could not be done in a commercial way by us, and our whole efforts have been with the purpose in view of determining what the proper technological method was, more especially in regard to what is the best method for the dehydration of vegetables.

Mr. ANDERSON. Have you done anything in the way of development for a market for these products?

Mr. CAMPBELL. That thing has been urged by the industry itself, Mr. Anderson, but I can not see that that is any part of our business; and we ourselves have not attempted to do anything with that. Very naturally it could not be done with a fund of this size, and our concern is to make available through the investigations that we have underway the methods which should be employed for the manufacture of a standardized article and then quit with that.

Mr. ANDERSON. What I mean is, is there any real development in the sale of these products commercially?

Mr. CAMPBELL. In certain products there are. Certain products are being put out in fairly well standardized fashion now, and very naturally the department is getting inquiries all the time where there is a desire to undertake this on a cooperative plan by agricultural communities themselves in the establishment of dehydrating plants. But until the department is in a position to prescribe the method by which this can be done and arrive at some logical and accurate conclusion concerning the cost that would be involved and the type of supervision that should be maintained, it can not speak in a definite fashion regarding the financial advantage that would accrue to a community from an undertaking of this sort.

Mr. BUCHANAN. When you speak of "dehydrating" you simply mean drying?

Mr. CAMPBELL. Yes.

Mr. BUCHANAN. Are the markets filled with dried fruits and vegetables, or is there any considerable market for dried fruit now?

Mr. CAMPBELL. Oh, yes; dried fruit is a pretty well established industry, but on vegetables it is hardly that, and I do not think that dehydration will ever be an industry actively supported in this country until we shall have determined some plan by which a standardized or stabilized product can be made. The experience that the chairman indicated a moment ago about cane sirup applies precisely to this situation.

Mr. ANDERSON. The next is the item on page 187.

FOR PREVENTION OF GRAIN-DUST AND OTHER DUST EXPLOSIONS AND FIRES.

Mr. CAMPBELL. That is the item for investigation and improvement of methods for prevention of grain-dust and other dust explosions and resulting fires, including fires in cotton gins and cotton-oil mills. Our work under that appropriation has divided itself into three different classes—the work that was done and is being done in a consulting way and in an advisory capacity on, first, the threshing-machine explosions and fires, and, second, the fires and explosions that take place in grain elevators and in industrial establishments, and, third, our work on cotton gins and in oil mills.

By devising a mechanical separator or remover for the dust on the threshing machine, and also by making provision for appropriate wiring to remove static electricity generated in the threshing operation and which was the cause of ignition in most cases, these explosions in threshing machines have been reduced to a very material extent. Our real problem has been in getting an observation of the precautions we have recommended. This work has been promoted very largely by State agencies, especially in the region of northern Idaho, eastern Washington, and northeast Oregon. There has never been recorded a fire and explosion in one of the mills where the devices recommended by the bureau have been adopted.

Mr. ANDERSON. Have any of the threshing machine companies adopted this method or device?

Mr. CAMPBELL. They are working with us on that basis, and they undertake to manufacture the equipment and install it on their

machines and are doing that in some cases extensively, having their own agents advocate the use of that in the sale of all these machines.

The insurance, by the way, you will be interested in knowing, was withdrawn on these machines in that particular region some years ago—absolutely denied in every respect; and then when the insurance companies entered this field again they charged prohibitive rates. Those rates have been reduced now to a point where they are fairly reasonable if the operator has employed the preventive measures we have advocated.

EXPLOSIONS AND FIRES IN GRAIN ELEVATORS AND INDUSTRIAL PLANTS.

The question of preventing the explosions and the fires that took place in grain elevators and industrial plants is a much more difficult one than involved in the threshing machines. We are studying the causes. That involves analytical study of all these explosions that take place. We attempt to do that just so soon as we possibly can, with an idea of determining what is the fundamental, responsible cause for the fire and the explosion itself. It is a simple enough thing to advocate the construction of elevators, for instance, in a way so that there will be the least possible facility given for the accumulation of dust. But we found that that within itself will not solve the problem.

You know that dust with a proper admixture with air is just as explosive as gas and a proper admixture of air. That fact has been demonstrated by the bureau, and we are concerned now—it varies, of course, with different products—in determining just what the situation may be in a plant; that is, measuring the amount of dust in suspension in the air in various establishments, to determine whether or not the danger point is being approached in the atmospheric situation in a particular plant; we have found out that an explosion of a violent character will take place if you have as much as one-fiftieth of an ounce of grain dust in suspension in 1 cubic foot of air.

We are working in cooperation with other agencies of the Government, particularly the Bureau of Mines, through their special interest in the prevention of mine explosions from dust, and also on the part of the Public Health Service for the purpose of health-control measures as that relates to dust carried in suspension in the atmosphere of particular places.

We are now perfecting a means for the measurement of the amount of dust in suspension in the air. If that can be reduced to a simple proposition, it will be an easy enough matter for the agency itself, for the industrial organization itself, or for the State agencies concerning themselves with this problem, to make an inspection of an establishment and determine whether or not there is a dangerous condition existing at a particular time, and whether or not attention should at once be given to the removal of that condition in so far as it is possible to do so.

There are two—as Mr. Price explained to you last year—explosions at least that are found to take place in connection with these catastrophes, the first of which within itself is not so violent and not so significant, but it is the secondary explosion that is always the one that creates the damage. There must be an ignition of the dust in some way, just exactly as there is required to be a spark in order to effect an explosion in a mixture of air and gas.

If that thing, in the first place, could be obviated and removed, it would prevent the explosion. But so long as you recognize that in milling operations you are going to find occasionally and beyond human prevention the presence of metallic products or mineral products that will of themselves, when thrown against machinery, ignite a spark which will of itself be sufficient to set off the explosion in that whole establishment, you can appreciate the difficulty of attacking it from that standpoint.

One of the things that has been advanced and has been usually found to be effective, too, is what we call the inert atmospheric control. If we could provide an atmospheric situation at the plant where ignition takes place, for instance, by the use of carbon dioxide, we would stop in that way the transmission of this flame—through the conveyor and other agencies that get into the bins where the dust will be found in suspension and where the extreme explosion takes place always producing damage.

Whether or not that is a practical proposition remains yet to be determined, and we are making progress in the study of that whole question through observations that are made and experimental work that is being done in the laboratories and in the establishments themselves.

MONDAY, NOVEMBER 20, 1922.

BUREAU OF SOILS.

STATEMENTS OF DR. MILTON WHITNEY, SOIL PHYSICIST AND CHIEF, AND DR. C. E. MARBUT, SCIENTIST.

SALARIES.

Mr. ANDERSON. We will take up your statutory roll as found on page 190.

Doctor WHITNEY. There are three decreases.

Mr. ANDERSON. Are the places filled?

Doctor WHITNEY. One position of laborer is filled.

Mr. ANDERSON. But you can get along without it, I suppose?

Doctor WHITNEY. Yes, sir.

Mr. ANDERSON. Then we will take up your next item, general expenses, Bureau of Soils. Suppose you tell us a little about what you are doing under this item on page 192, for chemical investigations of soil types, etc.

Doctor WHITNEY. Mr. Chairman, I have prepared a statement showing the work of the bureau as a whole and if you like, it can go in the record.

Mr. ANDERSON. It may go in the record.

GENERAL STATEMENT OF WORK.

The Bureau of Soils deals with the most fundamental and basic material in agriculture—the soil. It locates and classifies the different soil types and issues reports showing the location of these soil types, the kind of agriculture practiced and crops best grown upon the different types. It studies the composition and properties of the soil in order to discover those most important and corrective means to fit them better for agricultural use. It investigates the fundamental problems connected with the

chemical and physical characteristics of the soil. It studies sources of materials suitable for use as fertilizers or soil amendments and attempts to discover new sources of material and a better use of those materials at present known.

Soil survey.—The soil survey is the largest work undertaken by this bureau. A survey has been made of over one-third the continental area of the United States and the soils have been classified and mapped and reports issued regarding the soil types. This work embraces a large territory and has correlated more soils than any other similar work in the world. The soil map, as issued by the survey, is of large use to farmers or to those contemplating purchasing farm lands; it furnishes them with a basis upon which to judge the agricultural value of such lands. The railroads are using these maps in large number in their development work, and road engineers and sanitary engineers are demanding them to an increasing extent. The farm-loan bank and the Federal reserve banks are using them as a check in the valuation of farm lands, foresters are employing them as a basis of the value of soils when the timber has been cut. The Reclamation Service is making use of the maps for development work, particularly in providing efficient drainage and in the prevention of the rise of alkali; public schools of the country are using the maps for the education of the children regarding the physical structure and the agricultural wealth of communities. The Post Office Department and the Department of Justice make use of them for running down fraudulent land cases. The War College and other bureaus of the War Department have used them for the selection of sites for military maneuvers and other purposes, and investment companies are employing them in calculating risks involved in agricultural occupation and health conditions.

During the last year surveys were completed and begun in 69 counties in 29 different States. The area covered by detail surveys amounted to 27,337 square miles reconnaissance surveys were completed in an area comprising 18,314 square mile. In carrying out survey work this bureau has the cooperation of 27 States, namely, Alabama, Arkansas, California, Georgia, Idaho, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, West Virginia, and Wisconsin.

The Bureau of Soils, through its cooperation with these several States is able to correlate and unify the work in soil surveying as undertaken by these States. The classification and names of soil types, as adopted by this bureau, have been followed by the different States and this bureau is looked to for guidance as the leader in this work. If the soil surveys in the different States are to be of any general utility there must be some central agency which can correlate and unify them. The experiment stations are using the soil maps as a basis for extending their work in farm management studies and in their advice to farmers as to fertilizer needs and their experimental work which is carried on in the field. In addition to this regular work of the survey there has been cooperation with the Department of Justice and other bureaus of the Government where questions of soil classification and determination of land values has been involved. The soil maps are used by several States in determining the basis of taxation.

Fertilizer investigations.—For several years attention in the fertilizer investigations has been directed to concentrated fertilizers, with the object of presenting the possibility of manufacturing cheaper materials for the farmer. The importance of this has been especially impressed upon us because of the gradual absorption into feed stuffs of much of the nitrogenous material that heretofore has been used in fertilizers. We are now working along the lines of the preparation of high-grade concentrated fertilizers from low-grade or waste material, or materials not hitherto readily available. The preparation of such materials is dependent upon a new volatilization process for the manufacture of phosphoric acid. With phosphoric acid at a satisfactory price, there may be prepared compounds of ammonium phosphate, ammonium nitrate, potassium phosphate, or ammonium potassium phosphate, which may be mixed with ammonium nitrate or ammonium chloride from nitrogen fixation products to supply the farmer with a highly concentrated fertilizer material.

The work on nitrogen fixation with which the bureau has been concerned during the last year, in cooperation with the Fixed Nitrogen Laboratory, has had as its object the improvement of processes for the removal of ammonia from the gaseous mixture after its formation in the catalytic chamber. One of the main difficulties in the operation of the so-called Haber process is the efficient removal and collection of the ammonia after its formation, and in our work on this problem we have discovered certain solvents which give promise of effecting this removal more efficiently than has been possible before. A small unit, designed for this purpose, has been constructed and is being tried out experimentally in cooperation with the Fixed Nitrogen Research Laboratory. In addition to the work of the bureau on the fixation of nitrogen from the air, work is

being carried on to discover methods of utilizing the various waste, nitrogenous products which may take the place of some of the more expensive nitrogen products now going into feed stuffs.

Phosphoric acid.—Investigations on the utilization of run-of-mine and low-grade phosphate material have led to the discovery that these materials may be used in a process for the volatilization and recovery of phosphoric acid. As already pointed out, the manufacture of concentrated fertilizer material is dependent upon the volatilization process of making phosphoric acid cheaply, and by the utilization of this run-of-mine material a cheaper source of the manufacture of this phosphoric acid is assured. Material heretofore of little value has been utilized for direct smelting in the fuel-fed furnace. This material carries a low percentage of phosphoric acid and too much aluminum, iron, and lime to make it available for use in the ordinary manufacture of superphosphate, but these characteristics which are undesirable in manufacturing superphosphates impart a good slagging quality to the charge used in smelting. These experiments carried out with a small oil-fired furnace have been highly satisfactory and a larger and improved furnace has been installed at Arlington and is now ready for experimental runs. The earlier work of the bureau on the volatilization of phosphoric acid was done in an electric furnace. This method was so successfully demonstrated that the process has been taken up by an industrial concern and furnaces installed at Anniston, Ala. This company is now manufacturing phosphoric acid by this process, although all the product at present is going into high-grade chemicals and medicinal or food products.

Potash.—The Bureau of Soils is continuing to investigate the available sources of American potash, although at the present large amounts of German and Alsatian potash are coming into this country. The former work of the bureau has shown a number of different sources from which potash may be obtained, and these present a potential supply of such capacity that the emergency needs of this country could be met under conditions similar to those prevailing during the war, when the supply of German potash was cut off. Our demonstration of available American sources of potash renders the position of this country secure in the event that exorbitant prices should be charged for the foreign material. Further research may develop more efficient methods, so that American potash may compete normally with that from a foreign source.

A difficulty experienced in the use of American potash a few years ago was the presence of deleterious amounts of borax in the material produced from the Searles Lake brines. This bureau quickly discovered the source of this undesirable material and developed methods for detecting and determining the quantities of borax present in the potash. After our order designating the amount of borax permissible in potash the companies immediately changed their methods, so that all danger from this source has been eliminated.

Chemical investigations.—The work of the Chemical Division is closely interrelated with that of the Soil Survey and at the same time this division is depended upon for the investigation of fundamental chemical changes taking place in the soil. I think farmers and all those engaged in supplying the farmer with practical information concerning soil management will agree with me that fundamental soil chemical investigations are required before we can give certain aspects of farm practice the scientific certainty needed to make farming a less venturesome business. I refer particularly to the adaptation of crop to soil and the use of lime and fertilizers.

A large number of complete chemical analyses of soils must be made each year if the work of soil classification by the Soil Survey is to be conducted properly. The complete chemical analysis of a soil is an exacting and time-consuming operation, and although we have developed rapid petrographic methods for the examination of certain soil constituents, soil analysis forms a large part of the work of this division. From time to time also a considerable amount of chemical soil work on special problems must be done for other bureaus in the department and for other departments of the Government.

The investigation of fundamental soil processes for the past year has been directed chiefly to the colloidal matter in soils. Methods for determining the total quantity of colloids in soils are being developed, and we have found that soils contain from 5 to 50 per cent of colloidal material instead of 1 to 2 per cent, as some of the earlier soil scientists supposed.

Inasmuch as one kind of colloid may affect one property of the soil and another colloid affect another property, it is obviously important to develop methods for determining the different kinds of colloids in the soil. Certain colloids may influence the retention of plant food, which may be with or without much effect on the physical properties of a soil, or conversely.

This is a comparatively unworked field of soil investigation which gives promise of being most productive of both scientific and practical results.

Soil physics.—In the investigation of soil physics studies are made of the physical characteristics of the soil in their relation to the optimum soil conditions for plant growth. One of the important studies in this connection is that of the mechanical or textural composition of the soil.

Recently a great advance has been made in the study of the physical composition of the soil in the recognition of the very important rôle which soil colloids play in it. A new method is being tested out in which account is taken of the quantity of colloid present. The work has shown that much of the material formerly classed in the sand and silt groups rightfully belongs in the group of colloids. The result of the analysis, according to this new method, will express the percentage of colloid present in the soil. This will be of importance, because it has long been recognized that the physical condition suitable for tillage or other soil operations is closely related to the colloid content.

Experiments have shown that the bearing strength of soils varies with the changes in the relative amount of colloid and other grades of soil material, such as silt and sand, present. Work is proceeding at present with a view to establishing the relations between the composition and variations in bearing strength.

In addition to the fundamental researches on the physical condition of the soil, routine analyses of mechanical composition are carried out on samples of soil collected by the Soil Survey in order to assist them in determining the classification of the various soil types. Aside from the work done for the soil survey there is considerable demand for work by other organizations, such as the Geological Survey, the Mississippi River Levee Commission, the Bureau of Public Roads, and other agencies concerned with the use of soil material in structural work. The demand from these various sources show the wide applicability of mechanical analysis to the practical problems in relation to the soil.

In this division there are designed and constructed special pieces of apparatus required for the proper prosecution of the investigations along soil lines and which have wide applicability in the study of soil problems. One such instrument designed, namely, the electrical bridge, has been adopted for use in studying alkali lands, not only in this country but in Egypt and other alkali regions.

The past year has been exceedingly fruitful in bringing together the results achieved by the Bureau during its quarter century of existence into a modern concept of the soil, its various functional activities, giving us a comprehensive view of the soil, which has never been clearly understood before.

FOR CHEMICAL INVESTIGATIONS OF SOIL TYPES, ETC.

Doctor WHITNEY. The work of the chemical investigations has progressed very satisfactorily. I feel that in the last year or in the last two years, with the discoveries and investigations we have made of the soil colloids, we have a concept of the soil we have never had before. We have completed the separation of the functional activities of the soil into its component parts. Heretofore the world has been working along different lines of soil investigation, on chemical lines, on physical lines, and on practical lines, and we have been pushing each of these lines along as far as we can. It has only been possible, since our work on the soil colloids, to bring them all together and present a fair picture of the functional activities of the soil as a whole. We know now, through our investigations, the differences in the functional activities in this soil [indicating] which is a truck soil and not adapted to general farming, and the functional activities of this other soil [indicating] which is the strongest type of agricultural soil in the country—that is, for general agriculture—and while there will always be a great deal of work to do to find the specific faults we know, in a general way, why these soil types differ.

Mr. ANDERSON. Can you tell us why one soil is best adapted to truck while another soil is best adapted to grains?

Doctor WHITNEY. Yes, sir. We are understanding those things in our present concept of soils. We have brought all of these things together, the physical properties, the chemical properties, and the

biochemical changes in soils; we have shown their interrelation and the control we have of them through drainage, irrigation, cultivation, and cropping. In the chemical investigations we have been studying the properties of the soil colloids. It is the material that causes soils to shrink or contract when dry or wet; it is the material that holds the grains together and makes them plastic or hard when dry, and it is the seat of the absorbing power of soils for moisture and for gases, and is the seat of the important chemical changes that go on in the soil from releasing the so-called mineral plant foods and is the home of the biochemical changes that are essential to a healthy soil.

Mr. ANDERSON. What direction are your investigations taking now?

Doctor WHITNEY. Well, we have the material out; we are writing up now and have nearly ready for publication methods for determining the amount of colloids in soils. That is something we have never had before. There are some peculiarities about the methods due to some peculiarities about the colloids, but we have methods to propose for determining the amount of colloids in soils. Then the constitution of these colloids is a subject that will require a great deal of research.

Mr. ANDERSON. If I should send you a sample of soil from Minnesota what could you tell me about it?

Doctor WHITNEY. I could tell you the amount of colloids in it.

Mr. ANDERSON. That would not mean anything to me.

Doctor WHITNEY. Well, it would mean a great deal to us in the advice we would give you as to the treatment of the soil and as to its adaptation. Of course, that is not all. I am not claiming that this is the one thing that makes soils productive or nonproductive, but it is the missing link that the world has been looking for to bring all of these properties into their proper relationship. Of course, as I mentioned last year, we have a very small appropriation for the study of the chemistry of soils. We are not only working on the constitution of soils but we are working on the composition of soils at considerable depth below the surface. We are finding more and more that in order to understand the surface soil we have got to find out what there is in the deep depths. We have frequently heretofore worked on material at 6 feet below the surface but now we want to go 100 feet or 1,000 feet, if we can get samples. Then we are doing a great deal of routine work for the other bureaus and other departments.

Mr. BUCHANAN. Is it your idea that the character of the soil 100 feet deep or 500 feet deep has an influence upon the surface soil?

Doctor WHITNEY. Yes; we think it has.

Mr. BUCHANAN. Even though there are watercourses and rock between them?

Doctor WHITNEY. Yes. We do not think it has an effect to-day, but we think it has had an effect in the past ages in modifying the present soils we are working with.

Mr. BUCHANAN. In past ages the soil 100 feet down might have been surface soil?

Doctor MARBUT. Doctor Whitney has in mind the formation of caliche, which is so abundantly distributed over Southwestern Texas, and the question has been legitimately raised as to whether that caliche, which is now close to the surface and a part of the soil, did

not come from very great depths. Five hundred feet, of course, is just a figure, but at least from great depths.

Doctor WHITNEY. We have alkali salts which we believe have come from a very great depth, much deeper than we have ever supposed heretofore.

FOR PHYSICAL INVESTIGATIONS OF IMPORTANT PROPERTIES OF SOILS.

Mr. ANDERSON. We will take up the next item on page 193. Apparently the only thing which distinguishes this from the preceding item is that this has to do with physical investigations?

Doctor WHITNEY. Yes, sir; but requiring different methods and different men, men of different training, and it supplements the other. Both the chemical and physical investigations, of course, are based largely upon our soil surveys.

Mr. ANDERSON. We will take up the next item on page 194.

FOR INVESTIGATION OF FERTILIZER RESOURCES.

Doctor WHITNEY. For the investigation of fertilizers?

Mr. ANDERSON. Yes.

Doctor WHITNEY. We have had a very favorable year in our work on the study of fertilizer stock and fertilizer materials. As I have explained to the committee, it is divided into nitrogen work, phosphoric acid, potash, and miscellaneous soil amendments, such as lime, etc., and we have made very good progress. I think I told the committee last year that we have been working for some time on concentrated fertilizers. The trade, the farmers, and the experiment station workers have all realized for a long while that concentrated fertilizers are cheaper and more economical. With the introduction of nitrogen fixation methods, which started in Germany and have been most largely developed in Germany—in the fixation of atmospheric nitrogen into ammonia gas—we have got to make certain products that are not adapted to the chemical mixtures that our industry has been putting out in the past.

They have been using a great deal of waste products, and they have been making a rather dilute form of acid phosphate. They have been making it with 16 per cent, whereas the rock as it is in the ground carries 32 or more per cent. Their method of converting the rock phosphate into acid phosphate dilutes it approximately one-half, so that we get a weaker product than we had in the mine. Then our method of mining the rock for treatment with sulphuric acid has been a very wasteful one, because we have only been able to use the purer form of rock and have thrown on the dump about 65 per cent of the phosphorus we have mined. But with this method of volatilizing the phosphoric acid, which we have developed in the bureau, we are able to use the run-of-mine rock, thus saving the material that now goes to the dump and cutting out the expenses of the original preparation, because we use a lower-grade material.

Mr. ANDERSON. Is anybody using this new process now?

Doctor WHITNEY. Yes, sir; there is a concern at Birmingham, Ala., which is using it for the preparation of phosphorus, for the preparation of phosphate salts, first for food products and incidentally as

fertilizers, but their attention has been given heretofore to the preparation of food or chemical phosphates.

Mr. ANDERSON. What are you doing in the matter of nitrogen fixation?

NITROGEN FIXATION.

Doctor WHITNEY. In nitrogen fixation we are working in cooperation with the fixed nitrogen laboratory on methods for recovering the ammonia gas from the gases. We have been working on that for some time and it appears that we have a very successful method for separating the ammonia from the mixed gases and one which I think is likely to be of a great deal of benefit in its manufacture. That has been one of the great difficulties of the past. As to potash, we are working on the possible methods of extracting potash from our waste materials, from the iron furnaces and from the cement mills. Of course, we have dropped the kelp plant, but we are working on some of the mineral sources.

Mr. ANDERSON. You have a method of recovering from cement plants now, have you not?

Doctor WHITNEY. Yes; we have the method. We have made a survey of the entire industry but, unfortunately, they have run into difficulties in the separation of the potash, which is due to methods of manipulation. If they collect the dust too near the source of the heat some of it appears to be bound up and has been reconverted so that it can not be economically extracted. If, however, we allow the fumes to escape and we have a dust catcher interposed between the place where we collect the coarse dust and the fine dust we are finding that we can get a product that is almost completely usable. So that there are many things to work out and, apparently, they vary with different localities, and with the different kinds of materials they use for cement. We are satisfied we have a source of potash in this country if it can be produced at a low enough cost. The whole question is the cost and that means the details of manufacture.

FOR SOIL SURVEY INVESTIGATIONS.

Mr. ANDERSON. The next item is on page 196, for the investigation of soils, etc.

Doctor WHITNEY. That is the soil survey.

Mr. ANDERSON. In this item you have a reduction of \$48,200. What is the idea?

Doctor WHITNEY. I am unable to answer that question, Mr. Chairman.

Mr. ANDERSON. Maybe I can develop it. In how many States are you working this year?

Doctor WHITNEY. We are working in cooperation with some 29 States. All these States appear to be very enthusiastic and very well satisfied.

Mr. ANDERSON. How many will you have to cut out as the result of this reduction?

Doctor WHITNEY. Of course, I have made no plans as to this, Mr. Chairman. It is a cut of about 25 per cent in our soil survey appropriation, which would mean a cut of nearly 50 per cent in our field force.

Mr. ANDERSON. Are these cooperating States putting up dollar for dollar or more than that?

Doctor WHITNEY. On the whole, they are putting up more, or just about the same, I think. They put up about \$150,000 last year. I think their appropriation now is close to \$150,000, but not all would be used for field work, because they reserve some for their laboratory investigations and thus supplement our work. They do that the same as we have to carry a certain overhead here for the direction and inspection of the work.

Mr. ANDERSON. How much of this sum is spent in the field work?

Doctor MARBUT. Around \$100,000, or a little more. If you will allow me, I will say that the rest of that money is spent for information that is just as valuable for the soil survey as is the field work. For example, a great deal of that is spent in carrying on investigations in the field on the soil type for the purpose of determining the reaction of the crop to the soil type and also the reaction of fertilizer to the soil type. That is the State work and, as I say, of the \$150,000, which is State money, some is spent for that, but that is just as important for the soil survey as is the field work.

Mr. ANDERSON. I will try to get at these divisions. Of the \$168,200 of Federal money, how much was spent on field work, how much on laboratory work, and how much on overhead?

Doctor MARBUT. The Soil Survey has never equipped a laboratory. The physical analyses of soil samples is done by the Division of Physical investigation of soils and the chemical analysis by the Division of Chemical Investigations of Soils.

Doctor WHITNEY. We spent about two-thirds of the money in the field.

Mr. ANDERSON. I wish you would furnish me with a statement showing the amount you spent in each State and the offset of the State money as against that.

Doctor WHITNEY. Very well.

Statement showing Federal and State funds expended during fiscal year 1922 in States cooperating in soil-survey work.

| State. | Federal funds. | State funds. | State. | Federal funds. | State funds. |
|--------------------|----------------|--------------|---------------------|----------------|--------------|
| Alabama..... | \$4,753.50 | \$3,905.36 | New Jersey..... | \$5,063.28 | \$5,601.88 |
| Arizona..... | | 1,267.00 | New York..... | 3,709.32 | 1,027.68 |
| Arkansas..... | 4,007.08 | 15,000.00 | North Carolina..... | 7,350.89 | 6,113.44 |
| California..... | 6,679.58 | 4,408.15 | North Dakota..... | 1,958.76 | 1,753.70 |
| Georgia..... | 6,300.70 | 18,000.00 | Ohio..... | 3,786.66 | 14,000.00 |
| Idaho..... | 1,517.69 | 1,020.91 | Oregon..... | 3,123.41 | 1,500.00 |
| Indiana..... | 4,465.58 | 4,918.25 | Pennsylvania..... | 1,338.12 | 1,262.79 |
| Iowa..... | 10,779.29 | 118,000.00 | South Dakota..... | 3,081.86 | 12,500.00 |
| Kentucky..... | 328.03 | 362.50 | Tennessee..... | 2,470.29 | 2,133.19 |
| Maryland..... | 3,981.88 | 950.63 | Texas..... | 17,722.19 | 10,461.65 |
| Massachusetts..... | 1,437.43 | 768.07 | Utah..... | 785.52 | |
| Michigan..... | 4,204.25 | 5,172.53 | West Virginia..... | 729.04 | 600.00 |
| Minnesota..... | 2,939.60 | 4,962.94 | Wisconsin..... | 6,612.38 | 10,146.26 |
| Mississippi..... | 5,357.93 | 2,044.10 | | | |
| Missouri..... | 3,293.27 | 8,756.60 | | | |
| Nebraska..... | 5,455.16 | 17,500.00 | | | |
| | | | | \$123,265.54 | 124,138.63 |

¹ Estimated.

² Actual field expenses only. Does not include overhead, inspection and correlation, map work, and work in noncooperating States.

COOPERATION WITH STATES.

Mr. ANDERSON. Are you now cooperating with all the States that have requested cooperation and are willing to cooperate in the matter of finances as well as otherwise?

Doctor WHITNEY. Yes, sir,

Mr. ANDERSON. You are now taking care of all the requests?

Doctor WHITNEY. We are taking care of them but not as fully in some cases as they would desire and not as fully as their appropriations would warrant.

Doctor MARBUT. The lack, if we may put it so, of full cooperation on the part of the bureau consists largely in our having to employ cheaper men than the States employ in order to balance up the same number of men that the States have. The States, as a rule, pay higher salaries than we do and we employ a greater number of young, inexperienced men to balance up the number of men the States put in on cooperation. The deficit lies largely in that.

Mr. ANDERSON. What kind of people do you use in this work?

Doctor MARBUT. Agricultural college graduates or college graduates, usually agricultural college graduates. We have a few men from other colleges than agricultural colleges.

Mr. ANDERSON. Do they have to have any special training in this kind of work?

Doctor MARBUT. They have the special training they can get in this kind of work, but there is no place in the United States where a man can get training enough for soil-survey work to go right in the field and do perfectly satisfactory work without previous training. He must learn to do it by doing.

Doctor WHITNEY. And it takes two years, at least, with the best man before he can be put in charge of a soil-survey party.

Doctor MARBUT. Yes; fully two years.

Mr. ANDERSON. What do you pay men in the field?

Doctor WHITNEY. Our salaries range from \$1,320 to about \$2,300.

Doctor MARBUT. I think there is no man in the field getting—even men who have been 20 years in the service—a salary of over \$2,280. Of course, they have an allowance for field expenses in addition.

Mr. ANDERSON. Under this reduction what do you propose to do? Will you diminish your work in all the States or will you have to cut some of them off?

Doctor WHITNEY. We will probably have to cut a number of them off; we will probably have to reduce and also cut, because this is a pretty heavy cut, you see.

SOIL-SURVEY MAPS.

Mr. BUCHANAN. Is the only result of this appropriation and this cooperation the soil-survey maps you produce?

Doctor WHITNEY. Well, we produce the soil-survey maps and a report. You are familiar with the report describing the character of the soils?

Mr. BUCHANAN. It is attached to the maps?

Doctor WHITNEY. Yes, sir. In addition to that the States are interested because it gives them a basis for field experiments with regard to varieties of crops, methods of farming and fertilizer application. It gives them a basis for studying that is fixed and reliable.

Mr. BUCHANAN. Then, as I understand it, the result of this appropriation is the production of maps with the accompanying explanations?

Doctor WHITNEY. Yes, sir.

Mr. BUCHANAN. Of course, my State is a comparatively new State, that is, a young State from an agricultural standpoint, but in these older States, where the land is becoming impoverished by constant use, are they using these maps to any extent?

Doctor WHITNEY. Oh, yes; they are using them in the older States and in the Western and newer States. Here is a sample map [indicating].

Mr. BUCHANAN. I have seen the maps.

Doctor WHITNEY. This is a progress map of the soil survey.

Mr. BUCHANAN. The reason I asked the question was this: My county has been surveyed and I have about five or six thousand maps of it at my home. I have published the fact that I have them——

Doctor WHITNEY (interposing). You only had 2,000.

Mr. BUCHANAN. Well, it looks like five or six thousand. They are stacked up there, anyway. I published the fact that I have them for distribution, but I can not give them away.

Doctor WHITNEY. Have you taken it up with Doctor Youngblood, who is in charge of the State? He looks after those things in the State.

Mr. BUCHANAN. I have not taken it up with him, because the maps are on the ground and the people are down there on the ground.

Doctor WHITNEY. I do not know what our requests are for that particular locality. In what part of the State are you—in the eastern or western part?

Mr. BUCHANAN. In the south-central part.

Doctor MARBUT. Washington County, is it?

Mr. BUCHANAN. We have some poor land there, too, and we are not fertilizing it.

Doctor MARBUT. I think you are rather assuming a function for the Soil Survey that is not its most important function. The real function of the Soil Survey maps, in addition to giving the farmer certain information, is to furnish the experiment stations with a basis for further study or follow-up, as we call it, of the Soil Survey. The experiment station, for example, goes on to the soils that are identified in Washington County——

Mr. BUCHANAN (interposing). The real purpose of the maps, then, is a scientific purpose and it is for those who are scientifically trained?

Doctor MARBUT. It is for a scientific purpose and it is for those who are scientifically trained, yes, and it is used by those who are scientifically trained as a basis for further investigations in order to get information that is directly applicable to the farmer. That is the object of the Soil Survey.

Doctor WHITNEY. It has a scientific basis and, as a matter of fact, the Soil Survey map is relied upon by settlers who are seeking information about new localities. Then, too, it is used by the banks, the farm loan banks, and the Federal reserve banks. A member of the Federal Reserve Bank of Chicago was in my office last week in order to complete his list of the maps of their territory, because they find those maps of very great help to them in connection with the banking business they do.

Mr. BUCHANAN. My idea is that the soil survey maps, as far as the average farmer is concerned, are a failure. Of course, if they are supposed to be for scientific men and for the experiment stations of the States that is a different proposition. If they are produced for the purpose of enabling the scientific men and experiment stations to figure out the character of fertilizer needed for certain lands that is another proposition, but for the uses of the ordinary farmer they are a failure.

Doctor WHITNEY. Take the case of Baldwin County, Ala. Long before that map was issued we had requests for 50 per cent more than the law allowed us. We get 1,000 copies. That means that the entire edition was exhausted in a week by reason of requests that came to us from other parts of the country, not only requests from farmers in Baldwin County, Ala., but requests from farmers in Iowa, New York, or some other section of the country, farmers who may be thinking of moving. All of the department's quota goes to inquirers of that kind. Congressmen have 2,000 copies and many of them use their quota and many of them ask for more.

Doctor MARBUT. Mr. Chairman, may I say a word? The timber cruiser goes into a forest and maps the distribution of timber; he makes a map of it and that map is published. On that map should he necessarily, in order to perform his function, tell how to perform the technical work of the milling of that lumber. The Geological Survey goes——

Mr. BUCHANAN (interposing). Certainly not, and that is hardly a parallel case.

Doctor MARBUT. It is exactly the same thing.

Mr. BUCHANAN. No; that is another proposition altogether.

Doctor MARBUT. The Geological Survey maps the geology of the United States; it shows the different formations over the United States; it does not, however, go into a technical discussion of either the quarrying of the different rocks for different purposes, for the mining or for utilization at all. It is a fundamental thing, and the same is true of the soil survey. It is a fundamental thing to be used as a basis for further work.

Mr. BUCHANAN. I would not be surprised if there were not a great many maps published at the expense of the United States which, so far as practical use is concerned, are failures. I do not mean that scientific men and scientific colleges would not make good use of them, but from my knowledge of the soil survey maps I do not believe that the average farmer makes use of them; at least he does not in my section, and he does not in my county. That may be true as to forestry maps and as to Geological Survey maps, but as far as the average man is concerned they are of no use; but from a scientific standpoint, I suppose, they are all right, and it takes a scientist to understand them.

Doctor MARBUT. If, however, the results reach the farmers through the experiment stations, is that any argument against the fundamental work?

Mr. BUCHANAN. I admitted that to start with.

Doctor WHITNEY. You understand that the reason you got those 2,000 copies was because the law says you shall have that many. We have nothing to do with it.

Mr. BUCHANAN. I am not making any particular complaint about that, but my idea is that if they are for the use of the general farmer

they are wasted. I have already stated that these maps might be of use to scientific men and experiment stations, and it may be that the maps will only be useful in later years if they are preserved.

Doctor BALL. You have been making a just criticism, because I believe those maps are not sent where they should be. They are scientific maps to be used for generations to come, but instead they are sent out widely and distributed among farmers, politicians, and storekeepers who do not know their value.

Mr. BUCHANAN. Then you recognize my criticism?

Doctor BALL. Your criticism as to their distribution, yes; but that distribution is something over which we have no control. That distribution is made by reason of a law passed by Congress and we have no control over it. We would like to have it changed.

Doctor WHITNEY. That is the point I was trying to make, that they go out by law; we do not send them. Let me say that these soil-survey maps serve a very useful purpose in the way of stabilizing the values of land. A great many real estate dealers throughout the country are exhibiting these maps as a basis for selling land and they have brought about the sale of lands at somewhat their real value. These maps have cut out a good many of the fraudulent sales and misrepresentations. Then in some of the States they are being used for taxing purposes.

Mr. BUCHANAN. It is strange that scientific and practical minds always come in conflict. You say these maps aid in stabilizing the values of land. There is no way on the face of the earth of stabilizing the value of land or the products of land, because as the products of land go up the value of the land goes up, and if they go down, then the value of the land goes down. You can not stabilize land.

Doctor WHITNEY. Well, relatively you can. If there is a swampy section in here [indicating] that is shown on the map; the map would show that there was this swamp there and that much of the land was nonproductive, so that now it is very difficult for a real estate agent to sell that as productive land.

FOR EXAMINATION OF SOILS TO AID CLASSIFICATION OF AGRICULTURAL LANDS.

Mr. ANDERSON. We will take up the next item on page 198, for examination of soils to aid in the classification of agricultural lands.

Doctor WHITNEY. That is for the classification of agricultural lands and that has been going on just as heretofore. We have been working with many of the departments, the Reclamation Service, the Geological Survey, the Post Office Department, and the Department of Justice.

Mr. ANDERSON. What does the Post Office Department have to do with the classification of lands?

Doctor WHITNEY. Well, they have very important functions in land fraud cases. They are calling on us constantly for help in the classification and examination of lands to see whether the laws of the United States have been broken. We have had several very large cases of that kind that have come up in the last few years. We have one that has been dragging for over six or eight years, and the Post Office Department is still after the alleged fraudulent users of the mail.

Doctor MARBUT. May I state that that appropriation this year has been spent largely in reconnaissance work? For example, in northern

Minnesota we are making reconnaissance surveys for land classification at the request of the State to determine what is forest land and what is agricultural land.

Mr. BUCHANAN. Is it State land or private land?

Doctor MARBUT. Part of it is State land and part of it is private land. It is land. We do not inquire as to the ownership of that land at all.

FOR GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. On page 199 you have your general item for administrative expenses, which is the same as last year.

Doctor WHITNEY. Yes, sir.

MONDAY, NOVEMBER 20, 1922.

BUREAU OF ENTOMOLOGY.

STATEMENTS OF DR. L. O. HOWARD, ENTOMOLOGIST AND CHIEF; DR. A. L. QUAINANCE, ENTOMOLOGIST IN CHARGE OF FRUIT INSECT INVESTIGATIONS; MR. W. B. WALTION, ENTOMOLOGIST IN CHARGE OF CEREAL AND FORAGE INSECT INVESTIGATIONS; DR. W. D. HUNTER, IN CHARGE OF SOUTHERN FIELD CROP INVESTIGATIONS; MR. B. E. COAD, IN CHARGE OF BOLL WEEVIL INVESTIGATIONS; DR. JOHN E. GRAF, DR. E. A. BACK, DR. A. F. BURGESS, IN CHARGE OF GYPSY AND BROWN TAIL MOTH INVESTIGATIONS.

Mr. ANDERSON. Doctor Howard, do you desire to make any general statement?

Doctor HOWARD. I have a general statement which I have prepared for the record, if you desire to have it incorporated.

Mr. ANDERSON. It will be inserted in the record.

GENERAL STATEMENT OF WORK.

The number and seriousness of the problems connected with insect damage which the country has to confront seem to be increasing and demand untiring work on the part of the entomologists of the Federal department and those connected with the different States. The budget for the fiscal year 1924 has been restricted to the lowest possible limit and shows a decrease of \$492 from the amount appropriated for the current fiscal year. There is an increase of \$43,000 (represented by the requested increases of \$25,000 for deciduous-fruit insects, \$5,000 for forest insects, and \$13,000 for truck-crop insects), but this is more than offset by a reduction of \$4,500 in the statutory roll and \$39,292 in the working funds of the "Preventing spread of moths" appropriation.

WORK ON THE MAIN PROBLEMS OF THE YEAR.

Japanese beetle.—Work against the Japanese beetle is being vigorously prosecuted in cooperation with the New Jersey and Pennsylvania State departments of agriculture. A Federal quarantine (No. 48) and quarantines by the States of New Jersey and Pennsylvania are being operated, regulating interstate and intrastate traffic. Necessary attention is being given to the inspection of vegetable products, especially sweet corn, which is most likely to distribute the beetles. During the season of 1922, some 205,000 baskets of corn were inspected and more than 5,000 beetles removed from within the tips of the ears, some of which number might otherwise have been

distributed along with the corn to points more or less remote from the infested area. Active scouting work to determine the limits of infestation of the pest has been carried on, covering some 400 square miles, with the result that there was found to be infested approximately 213 square miles in New Jersey and 57 square miles in Pennsylvania.

Along with the quarantine work biological studies of the insect have been prosecuted with much success. Investigations of insecticides and methods of control have been given a prominent place, including the treatment of the grubs in the soil, use of poisons and repellants sprayed on foliage, the destruction of the grubs by agricultural methods, etc. Much attention has been given to the inspection of nursery stock in the infested territory, and provision made for moving this when possible under the quarantine regulations.

A large number of parasites of the Japanese beetle have been imported from Japan. These are being propagated and extensive liberations of the parasites will be made in the spring. An investigation of parasites in other parts of the world than Japan is planned, including as many regions as possible where the Japanese beetle or its near relatives are known to occur.

European corn borer.—In August, 1921, the corn borer was discovered to have become distributed, probably by flight from Ontario, along the entire southern shore of Lake Erie in Pennsylvania, Ohio, and Michigan. In order to study the insect in its new environment, a field laboratory was established at Sandusky, Ohio. Headquarters for the scouting work and the inspection and certification of crops were also established at Cleveland and Toledo. During the summer of 1922 very little change has occurred in the distribution of the insect in the regions mentioned, although a slight spread into contiguous territory has been observed. No commercial damage has yet become apparent there, but it is feared that serious damage to the corn crop will result within a few years if the insect is not kept in check by timely action on the part of agricultural workers. In the western New York area, near Buffalo, an extensive eastward spread occurred during the flight season of the moths this year. The edge of this infested area now coincides with the eastern border of Wyoming County. A slight increase in the amount of injury to corn was noted, but the losses incurred are not yet of a very serious character. In eastern New York little change has been noted. The spread has been slight and the intensification of injury almost imperceptible.

In Massachusetts, where the corn borer has two broods per annum, a very considerable increase in injury to garden crops in general, and especially to celery, beets, and beans, has occurred. Serious injury has also been observed on certain flowering plants grown for market purposes, such as gladioli, dahlias, asters, and chrysanthemums. A very marked and extensive dispersion by flight has occurred in New Hampshire, Rhode Island, and Maine during the late summer as a result of the dense character of the infestation in the areas existing immediately surrounding Boston.

The research work on the corn borer has been vigorously pressed to determine practicable means of control, and a farmers' bulletin giving the results of these investigations is in press. This will contain recommendations for the control of the pest, chiefly by means of changes in agronomic practice and the consumption of the infested crops in a manner to destroy the insects contained in them. Investigations looking toward the discovery of an efficient insecticide are being conducted, but as yet do not promise success. The fumigation of dried crops for possible movement from the infested areas has received much attention.

The work of introducing the natural enemies of the corn borer from Europe has progressed rapidly, and more than 1,000,000 individuals of a single promising species of parasitic wasp have been liberated in Massachusetts during the past summer. At present another distinct species is being propagated with similar treatment in view. Several additional insect parasites have been discovered, which it is believed may function beneficiary when introduced into America.

Cotton boll weevil.—Excellent progress has been made in the control of the boll weevil by the calcium arsenate dust. Very many planters have used this process with profitable results during the year, and it has been constantly simplified and cheapened and adapted to different regions. Experiments have been made in the use of the airplane which show that in this way the amount of poison can be cut in half and which indicate the possible use of this instrument for dusting on large plantations or in regions of almost continuous cotton culture and suggest that it may come into play in community service.

The general feeling throughout the regions where the boll weevil has been present for several years is one of encouragement, and it has been shown in many cases that by the application of cultural methods recommended by the department even the small planter on comparatively poor soil may raise cotton under boll weevil conditions at a profit.

Mexican bean beetle.—Investigations on the Mexican bean beetle have been continued in the southeastern United States, principally in Alabama, the work being specially devoted to control methods. Arsenicals of all types have been tested and will be continued in cooperation with entomologists of all infested States in relation to injury to bean plants and to the destruction of the insect. Biologic studies have been continued, a promising tachinid parasite has been imported from Mexico, and efforts are being made to colonize it during the next year. The beetle, first reported in Alabama in 1920, has since invaded Georgia, Tennessee, Kentucky, Virginia, and the Carolinas, and, at the present rate of spread, will soon reach Indiana, Ohio, and West Virginia, and probably Mississippi, besides increasing its range in all of the States first mentioned. In the Estancia Valley of New Mexico the ravages of this beetle are enormous and growers are asking the department's aid.

Gipsy moth and brown-tail moth.—At the beginning of the fiscal year the work was resumed with an appropriation of \$400,000, while \$500,000 was really needed to properly carry out the bureau's program of restricting the spread of the gipsy moth in New England and to follow up the exterminative measures inaugurated in the large infested area in New Jersey, as well as treatment of small colonies in New York State. When additional funds became available on May 11, the work was at once enlarged and vigorously prosecuted, though the results were seriously interfered with by the abnormal heavy rainfall during June. A colony of gipsy moths found at Greenport, Long Island, and a small colony at Patchogue, Long Island, were carefully treated and sprayed. Five small colonies in other localities in New York were carefully inspected and treated and no infestation was discovered this year. It is therefore believed that the insect has been exterminated in these colonies. The nine isolated colonies in New Jersey appear to have been eradicated as no infestation has been found in any of them. These areas will be rescouted another season and treated if infestation develops. The Somerville (N. J.) infestation was thoroughly scouted by late spring, though insufficient funds made it impossible to accomplish the amount of cutting work desirable on several river bottom areas. While a large amount of spraying was done in New Jersey it proved less effective on account of almost continuous and heavy rains during May and June. The work, however, resulted in a sharp decrease in the number of caterpillars over the previous summer, and in no place in the State was there any serious defoliation by the gipsy moth. No trace of the insect has been found in the area previously infested in Pennsylvania.

On July 1, 1922, the Federal Horticultural Board placed under quarantine for the gipsy moth additional areas in New England, representing a total of 3,645 square miles; on the other hand, several towns were released from quarantine as no infestation was found at the time they were examined.

Some scouting has been done along the border of the brown-tail moth infestation, and as a result of this work a heavy decrease in infested areas during the year has been noted. Two thousand, three hundred and forty-two square miles have been released from quarantine, including areas in Maine, New Hampshire, Massachusetts, and Rhode Island.

The parasite investigations have been enlarged by the dispatch of one expert assistant to Japan and one to Europe. These men will make a careful study of gipsy-moth conditions in these countries and ship parasites and other natural enemies to America. It is hoped that information may be obtained as to the causes of the fluctuation of the insect in its original homes, which knowledge may be helpful to us. The parasites and other natural enemies of the gipsy moth and brown-tail moth already established in New England are being found in large numbers in some localities. Colonization work has been continued and areas in all infested States received plantings of parasites where these did not occur there before. The temperature during the winter was extremely low in many sections of New England, resulting in the failure to hatch of many egg clusters of the gipsy moth. Defoliation therefore has been less than in previous years, particularly in the localities where the egg clusters were laid high on the trees and not protected during the winter by snow or ice.

OTHER INVESTIGATIONS.

In addition to the main pests mentioned above, notable progress has been made in the campaign for the suppression of the plum curculio in the Georgia peach belt and also in North Carolina. The use of paradichlorobenzene for the control of the peach borer has become quite general among commercial peach orchardists and has resulted in large savings in the cost of control of this insect. Many practical points have been discovered in the work on the codling moth in the Pacific Northwest. A new spray has been developed for the San Jose scale which is especially applicable in the Ozark region of Missouri and Arkansas as well as in southern Illinois and Indiana. This

consists of a 2 per cent engine oil thoroughly emulsified with potash-fish-oil soap and is used as a dormant treatment for the scale, costing about one half less than the standard lime-sulphur wash.

Studies of the sorghum midge, the so-called green bug of cereal crops in the Southwest, and of the Hessian fly, have been continued with excellent results. Grasshopper investigations were carried on in Wyoming, Montana, and North Dakota, as well as in Oregon, California, Arizona, and Texas. Further progress was made toward the control of the alfalfa weevil by a method of dusting with arsenicals which promises simpler and cheaper control. Work has been continued with tobacco insects, including the horn worm, flea beetle, budworm, and tobacco thrips, and also with sugar-cane insects.

In forest-insect control, a very striking cooperative bit of work has been carried on in the Northwest against the yellow pine bark beetle. In this work the Forest Service, the National Parks Service, the office of Indian Affairs, and associations of private owners have cooperated, and during the spring of 1922 control work was carried on in the Klamath region of Oregon which promises to give results of great value.

The work on the sweet potato weevil eradication has been continued in Florida, Georgia, Alabama, and Mississippi, with very favorable results in the first three States. In Mississippi, however, a number of new infestations have been reported. The pea aphid, which has become a serious pest in recent years, especially in New York, California, and Wisconsin, on cannery peas, has been intensively studied, and there is every prospect of the working out of a cheap and satisfactory method for its control. A newly imported potato and tomato weevil has made its appearance in Mississippi and is being intensively studied.

The experts engaged in the investigation of insects affecting stored products have been at work upon the insects attacking wheat, corn, and other grains in farmers' bins, warehouses, grain cars, ships, and elevators. Intensive studies have been made of the Angoumois grain moth, or fly weevil, that has done much damage to the 1922 crop of winter wheat in the Eastern States. Investigations have been carried on in cooperation with the Bureau of Chemistry to discover a more satisfactory fumigant for grain cars, and studies have been made of weevils attacking beans, peas, and cowpeas in storage. Insects affecting fabrics made of wool, hair, furs, and feathers have been studied.

Many important studies have been continued with reference to bee culture, all the problems of importance to practical beekeeping being borne in mind.

THE DECREASES SUBMITTED.

The amount for statutory salaries is reduced in the estimates by \$4,000, which is explained by the fact that five preparator places at \$840 have been dropped.

The amount submitted for the investigations of the gipsy moth and brown-tail moth is \$531,000, which is an apparent decrease of \$69,000 from the amount appropriated last winter. However, as \$100,000 of the amount appropriated last year was set aside as immediately available, on account of the lateness of the season only a portion of it was spent before the end of the fiscal year, leaving an actual decrease of \$39,292. This, with the decrease of statutory salaries (\$4,200) is \$43,492, which shows a total decrease of estimates from last year's appropriation of \$492.

THE INCREASES SUBMITTED.

Under deciduous fruit insects, an increase of \$25,000 is requested, \$20,000 of which is to provide for the strengthening of the work against the Japanese beetle. The rapid spread of this beetle and the tremendous increase in its destructiveness during the past year have so increased the problem of its control that an entire reorganization of the work will be necessary. It is proposed to abandon the project of certification and inspection of field crops, such as sweet corn, etc. The area of infestation now includes so many large nurseries that the expense of inspecting nursery stock will require all the funds available for inspection, leaving the increase asked for to provide for the extension of research work and the development of control measures. If the continuation of the field inspection work is to be considered, this will need to be done on an entirely different basis from that in effect at present and will involve much larger sums of money than this appropriation provides.

The other \$5,000 of the \$25,000 asked for will be expended in the investigation of pecan insects, especially the green soldier bug and the pecan-nut case borer which have recently become seriously destructive in Georgia and Florida. This investigation is urgently demanded by pecan growers in the Southeastern States.

An increase of \$5,000 is asked for forest-insect investigations. Of this amount it is proposed to expend \$2,500 for experiments with methods for preventing losses from timber-boring insects, including studies of the treatment of green logs with chemical mixtures and in other ways, and other practical methods of handling forest products to prevent insect damages. Work of this character was begun on a small scale in Georgia, South Carolina, and Virginia, and has resulted already in great savings in timber.

The remaining \$5,500 will be spent in a special study of insects affecting shade trees and hardy shrubs.

Under the head of insects affecting truck crops and stored products an increase of \$13,000 is asked. Of this amount, \$4,000 will be spent in an investigation of pea aphid injury to cannery peas, which will be carried on at the urgent request of the National Cannery Association and of many growers of peas for canning purposes.

Three thousand dollars will be spent in the study of the new Irish potato and tomato weevil in Mississippi. This is an insect pest entirely new to this country, recently accidentally introduced, and it should be intensively studied, since it may possibly become a serious pest.

Three thousand dollars more of this amount will be spent in the study of insects affecting textile fabrics. Very little research work on this group of insects has been possible up to the present time, on account of lack of funds.

The remaining \$3,000 will be spent in the study of the effect of low temperatures upon the life of insects that attack articles placed in cold storage. The department so far has been unable to give authentic data to business firms making inquiries in this direction.

SALARIES.

REDUCTION IN STATUTORY ROLL.

Mr. ANDERSON. We will take up first the item for your statutory roll. There appears to be a reduction of \$4,200 in that item.

Doctor HOWARD. We drop out five entomological preparators.

Mr. ANDERSON. Are all of those places vacant now?

Doctor HOWARD. Nearly all of them are vacant, yes; because we can not get anybody to work for that salary.

FOR DECIDUOUS FRUIT INSECTS INVESTIGATIONS.

JAPANESE BEETLE.

The next item, on page 202, calls for an increase of \$25,000. Doctor Quaintance will explain that item.

Mr. ANDERSON. For what purpose do you want that increase?

Doctor QUAINANCE. Mr. Chairman, that is to enlarge the work, and especially the research features of the work. The Japanese beetle is proving to be a very troublesome insect. We are carrying on investigations along various lines and we need additional funds to successfully prosecute these. We are handling nursery inspection and scouting work also under the research allotment. The territory covered by the beetle is rapidly increasing, being now almost twice as much as last year.

Mr. ANDERSON. This is the bug that attacks the soya bean?

Doctor QUAINANCE. No; that is the Mexican bean beetle in the South. This Japanese beetle is located around Philadelphia and adjacent New Jersey.

Mr. BUCHANAN. What does it attack?

Doctor QUAINANCE. It attacks a large variety of plants; it is especially injurious to fruit and shade trees, and infests certain field crops like sweet corn and certain other vegetables. This increase in funds is needed to increase the research work and the inspection of nursery stock. There are a number of activities to provide

for, as additional scouting work, to ascertain the further spread of the insect, as well as to increase certain projects of research dealing with insecticides, disinfection of nursery stock, and to enlarge the search for parasites from foreign countries.

Mr. ANDERSON. Where is this bug located now?

Doctor QUAINANCE. It occurs in the region of Philadelphia. Here is Philadelphia County (indicating on map); here is the Delaware River and this part is New Jersey (indicated). The insect is on both sides of the river. This (indicating) represents the territory infested in 1921, 270 square miles; the green area represents the 1922 area, which is 773 square miles.

There are several nurseries in that territory. Some of the largest nurseries in the United States are near Philadelphia and are located where those greenish spots appear on this map close to the infested area. The nurserymen themselves are very much perturbed about the effect this insect may have upon their nursery business, especially in the view of the type of stock they grow. They propagate many ornamental plants, especially evergreens, and these must have around the roots a small ball of earth so that they will live when replanted. Now, this insect, in one of its stages, is a grub, like the common white grub. It may get into the soil around the roots of the nursery stock. It is almost impossible to disinfect these balls of earth and ship them out safely. One important reason for asking an increase in this item is for research work to ascertain a method of doing away with the balls of earth around the nursery stock, or of treating them so that they can be shipped and replanted with success. We have installed in some apparatus that lowers or raises the temperature suddenly. We have been putting the plants through that. We have been using gases and solutions of various sorts. We have been doing this in the hope of showing the practicability of safely replanting coniferous stock with earth removed from the roots. It is estimated that this insect will soon affect nursery interests valued at \$10,000,000 or \$20,000,000, and we are anxious to do something this year for the nursery trade in that section of the country.

FEDERAL AND STATE QUARANTINES.

Mr. ANDERSON. Is a quarantine now maintained against this area?

Doctor QUAINANCE. There are Federal and State quarantines on now; yes.

Mr. ANDERSON. How does that operate and what does it operate against?

Doctor QUAINANCE. It involves the produce likely to distribute the insect, especially the sweet corn in this area. The adult beetle has the habit of entering the tip of the ear; the ear when pulled off is sent to market in baskets. We inspect all of the sweet corn from the territory for the purpose of preventing the spread of this beetle to distant places, but permit the produce to go to local markets where the insect occurs. Ninety per cent of this corn goes into the Philadelphia market. We have found some four or five thousand beetles this year in the tips of ears of sweet corn, and if we had not found them the chances are that some of them would have been scattered long distances. Our principal concern is to prevent the long-distance spread of the beetle, realizing that we can not prevent its normal spread from year to year.

Mr. ANDERSON. There is no known method of eradicating it?

Doctor QUAINANCE. No. The nature of the country in this area is such that it would be impossible. It is thickly settled with small properties; it is a suburban district and it can not be done.

Mr. ANDERSON. To what extent has it interfered with the growth of truck crops and other crops in that district?

Doctor QUAINANCE. It has caused a material interference with the growth of peaches and apples. The beetles are out on the wing as peaches are ripening and as early apples are ripening; the beetles collect on the fruit and spoil it for market purposes. Along with that they defoliate the trees, and it is necessary to protect these orchards by spraying. To do this, spraying is necessary at a time when it is quite unwise to spray, because the fruit may carry more or less of arsenic, objectionable from various standpoints. So there is an awkward dilemma; if you protect the fruit from the beetle you may poison it. At the same time the beetles are attacking shade trees in various parts of the district and defoliate them more or less. We are working on other insecticides which will not be so objectionable, and we hope we can secure one that will enable us to spray the ripening fruit and not possibly interfere with its sale.

FEDERAL AND STATE CONTRIBUTIONS.

Mr. ANDERSON. And how much are you spending on this bug altogether?

Doctor QUAINANCE. We are spending at the rate this year of \$100,000, \$65,000 for research work and the balance for this quarantine and inspection work.

Doctor BALL. You should make clear the change in program next year.

Doctor QUAINANCE. We are planning to spend another year, \$85,000 on research work so that the entire increase of \$20,000 will go toward increasing that work, and maintaining the inspection service at \$35,000, the same as at present. The area infested has become so large that considerable additional money will be necessary to handle the quarantine and inspection of field crops and prevent its long distance spread. That item has not been asked for yet; I think you will find a note to that effect in the Book of Estimates. We expect that the states of New Jersey and Pennsylvania will support the work liberally; in fact, we think that Pennsylvania will perhaps appropriate as much as \$50,000. The entomologist and, perhaps, other officials have committed themselves to that recommendation.

You, probably, are not interested in the different plans for handling this question of quarantine of field crops, but briefly one involves the throwing of the entire Philadelphia area open to the unrestricted movement of produce from the infested area. In that way we would be relieved from a large amount of inspection and all we would have to look out for would be the transshipment of the produce along the roads by trucks and now and then by rail. Another plan would be to make inspection of field products in the field at the source, as we have been doing, which we figure would cost materially more. It is a question of the relative efficiency of the two plans and funds available.

Mr. ANDERSON. They are able to produce crops of vegetables and fruits even with the progress of this bug?

Doctor QUAINANCE. Oh, yes.

Doctor BALL. Its damage is not so much to the production of the crops as it is to the sale of them on account of the distribution of the bug. If we take off this quarantine and allow free movement then its damage to the truck crops will not be great; its damage is to the meadow grasses in its grub stage and to the fruit, cherries, apples, peaches, and grapes, and a large number of shade trees in the beetle stage. It does not damage the truck to any great extent but it damages the sale of it. The appropriation you are being asked to consider now contains no item at all for maintaining this quarantine against truck crops but does contain money to maintain the quarantine on nursery stock which will go all over the United States.

DESTRUCTION OF CORN, TREES, ETC., BY BEETLE.

Mr. BUCHANAN. You say it attacks sweet corn; does it ever attack ordinary corn?

Doctor QUAINANCE. To a limited extent.

Mr. BUCHANAN. Do you have any reason to believe that it will become a menace to ordinary corn?

Doctor QUAINANCE. I do not believe it will.

Mr. BUCHANAN. It goes in the end of the ear just like the old corn worm?

Doctor QUAINANCE. Yes, sir.

Mr. BUCHANAN. Is it like the old corn worm?

Doctor QUAINANCE. No; it is a little bronze colored beetle, about that long [indicating].

Mr. BUCHANAN. Is it a worm?

Doctor QUAINANCE. No; it is a hardshelled beetle.

Doctor BALL. It is a blue June bug.

Mr. ANDERSON. You say that in the beetle stage it attacks both fruit and foliage?

Doctor QUAINANCE. Yes, sir.

Mr. ANDERSON. To what extent does it eat the foliage?

Doctor QUAINANCE. It will defoliate trees.

Mr. ANDERSON. Then it will kill them?

Doctor QUAINANCE. It will kill them; yes. I have seen old apple trees almost defoliated as well as the young growth in many orchards.

Mr. ANDERSON. Do you have any reason to believe that it will become so numerous in the infested area that if not curbed it will destroy all the trees?

Doctor QUAINANCE. There is every indication of that. Since the insect was found in the center of this territory it has been increasing at a very rapid rate. This summer it occurred literally by the thousands where it occurred by hundreds last year.

Doctor BALL. In the center of that area they stripped every single leaf off of practically every cherry tree within an area of a mile square.

Mr. BUCHANAN. If this beetle feeds on leaves, why is it not easy enough to poison it?

Mr. QUAINANCE. It is very sensitive to any foreign matter on the foliage, and often refuses to eat.

Mr. BUCHANAN. Does it feed on a specific kind of trees, or does it feed on nearly everything?

Mr. QUAINANCE. It feeds on about everything, including weeds.

Mr. BUCHANAN. Has it done any damage where it came from in Japan?

Mr. QUAINANCE. It is held in check there very well by climatic conditions and parasites; we have two of our men in Japan studying it.

Mr. BUCHANAN. Have they done anything over there trying to kill the beetle?

Mr. QUAINANCE. It is not an economic pest there, except locally and in occasional years.

Doctor BALL. Japan has no grass lands. The white grub breeds in grass lands.

ATTACKS FRUITS OF ALL KINDS.

Mr. BUCHANAN. Does it attack fruits of any character except apples and peaches?

Doctor QUAINANCE. It attacks cherries, grapes, and pears, and probably plums; it will eat almost anything. Our records of its injuries to plums are meager, because plums are not grown to any great extent in the area.

Mr. BUCHANAN. You think, then, if it lives in Japan it will live in nearly every section of the United States?

Doctor QUAINANCE. There is every reason to believe it will spread in every direction.

Mr. BUCHANAN. Its greatest damage seems to be to grass; is that it?

Doctor QUAINANCE. In golf courses it eats the grass, especially on the putting greens, where the turf can sometimes be rolled up like a blanket.

PECAN INSECT WORK.

Doctor HOWARD. There is another slight increase in this of \$5,000, Mr. Chairman.

Doctor QUAINANCE. That is an enlargement of the pecan insect work in the South—in Georgia, Florida, Alabama, etc. There have appeared there recently two serious insect pests of the pecan: One the so-called southern stink bug, which is a green foul-smelling bug that breeds especially on the cowpeas, grown largely in the orchards for soil improvement purposes. They cut these peas for forage or they die down and the bug migrates to the pecan trees and punctures the nuts which at that time are still tender. The result of the puncture apparently is to cause dwarfing or deterioration of that part of the kernel in the shell—the meat—that was punctured; and last year and the year before there was a very heavy loss reported of this peculiar character. The nuts looked all right and were sent out to the trade, and then the complaints came in, and the brokers and growers were quite at a loss to detect the trouble and stop it. That is one of the insects that the pecan growers have made representations to the department about.

Another is a small caterpillar, the larva of a little moth, that appears in the spring about the time the little pecans are formed. It bores into the nuts and the nuts fall, and the injuries have been very severe in the Southeast for a couple of years and is on the increase. This insect has been quite bad in Texas and some years destroys the bulk of their crop on the river bottoms. In Georgia we think it quite possible to stop that trouble by sr

Mr. BUCHANAN. You have got a hard job to spray pecan trees.

Doctor QUAINANCE. We would not be able to spray Texas river-bottom trees economically.

Mr. ANDERSON. Have you finished with your increases under this item?

CEREAL AND FORAGE INSECTS INVESTIGATIONS AND FOR THE CONTROL AND DESTRUCTION OF GRASSHOPPERS.

Doctor HOWARD. There is no increase asked for under the next item nor under the item following that. Of course, if you wish to ask any questions we are here to answer them.

Mr. ANDERSON. Have there been any serious outbreaks of the Hessian fly this last year?

Mr. WALTON. No; there have not been any severe outbreaks during last year.

Mr. BUCHANAN. What does it attack?

Mr. WALTON. It attacks wheat, rye, and barley.

FOR INVESTIGATIONS OF INSECTS AFFECTING SOUTHERN FIELD CROPS.

Mr. ANDERSON. The next item is on page 206, investigations of insects affecting southern field crops, including insects affecting cotton, tobacco, rice, sugar cane, etc. Does this item on page 206 include cotton boll weevil?

Doctor HOWARD. Yes, sir.

Mr. BUCHANAN. What have you been able to do with the boll weevil?

Doctor HOWARD. I will ask Doctor Hunter to tell you about that.

PROGRESS OF THE BOLL-WEEVIL CAMPAIGN.

Doctor HUNTER. Mr. Coad is the man right from the firing line, and he could answer questions more specifically and more directly than I could. However, a large part of the campaign this year was in testing out poisoning in different localities. A number of problems have arisen with reference to the local conditions and their effect on this process of controlling the weevil by poisoning. In your State, Mr. Buchanan, of Texas, in 1921 we had a number of experimental areas where the application of the poison was made by our men. In all cases the results were successful; that is, an increase in the crop was obtained that more than covered the cost of operations.

This year we had no specially supervised experiments in Texas, but a great many farmers all over the State applied poison. Toward the end of the season we made an effort to check up, to get some reading on the practical experience of these farmers.

In every case in our publications and in letters and other communications we have emphasized the importance—this applies more especially to Texas, but applies more or less everywhere—of the necessity on the part of farmers providing some check area where the poison is not applied so that they will be able to figure out what results they actually obtained.

In Texas we made an effort to get a complete list of all users of calcium arsenate. We succeeded through the jobbers and from other

sources in obtaining a list of 110 users. We had an agent visit each one of those farmers scattered throughout the State to find out what results they had obtained, whether they had provided checks or not. Unfortunately in only 29 out of the 110 cases had the farmers provided checks. So there was no direct reading of the results they had obtained. In 28 out of these 29 there was an increase in production ranging from one-seventh of a bale up to fully a bale to the acre.

Mr. BUCHANAN. They did report an increase of a bale to the acre, did they?

Doctor HUNTER. Yes, sir.

Mr. BUCHANAN. I am afraid there is another Ananias Club down there.

Doctor HUNTER. Some of them were your good citizens in the county of Hidalgo. I have a full record that I will be glad to place in your hands.

In the majority of cases the farmers did not provide checks; they did not seem to realize the importance of doing that sort of thing.

Mr. BUCHANAN. Does the cost still remain about \$6 or \$8 an acre?

Doctor HUNTER. It seldom goes as high as that.

COST OF POISON PER ACRE.

Mr. COAD. The averages from costs from the various points this year vary somewhat from the States, but around \$2 to \$5 an acre. I do not believe we have any over \$5 an acre for seasonal treatment.

Mr. BUCHANAN. Is that poison applied with the big machines?

Mr. COAD. Every type of machine available is included in the records. For example, we have very excellent work—

Mr. BUCHANAN (interposing). How many applications?

Mr. COAD. Well, it varies even on the same property. For example, you take a single property and in striking your average on the place some land may receive one or two applications and another part as much as six applications. You will find it costs right around—

Mr. BUCHANAN (interposing). I am not talking about the cost per acre of one application or two applications; I am talking about the cost per acre with one or two applications that are essential to get the desired results.

Mr. COAD. Yes, that is what I was talking about, the season's treatment, in other words.

Mr. BUCHANAN. One or two applications is not a season's treatment, is it?

Mr. COAD. It is for some lands; yes. Take, for example, a great deal of Texas area, and sometimes in Louisiana and Mississippi, you have some areas adjoining timberland or gins or points of hibernation, from where the boll weevils come out after hibernation that may require four to six applications. Other areas adjoining those will take perhaps but two to four; other areas infested only late in the season require one or two applications merely to protect the young bolls.

DEVELOPMENT METHODS TO CONTROL BOLL WEEVIL.

Mr. BUCHANAN. Has the department given any consideration to the recommendation of this Florida university?

Doctor HUNTER. That announcement was made very recently and marks a very important advance in the control methods of the weevil and brings up a number of questions which need to be investigated with a great deal of care. Undoubtedly a very important advance has been made in that work, but there have been points raised by the author of the bulletin himself about the applicability of it to other conditions.

Mr. ANDERSON. What is this new proposition? I did not see the bulletin. I got a circular on it, but I did not get the bulletin.

Doctor HUNTER. In brief, it is simply this: Plant the cotton about the ordinary time, and do nothing toward the control of the boll weevil until about the 5th of June, under Florida conditions, when all of the weevils that have passed through the winter have emerged and made their way to the fields. During the weeks immediately preceding the 5th of June the vast majority of those hibernating weevils will die; that is the natural course shown by a very large number of observations which have been made. Consequently, about the 5th of June there will be a very small number of weevils in the fields, and those that are there will be dying rapidly. Some will be depositing their eggs. At this low ebb in the reproduction of the weevil all such weevils as are in the plants at that time are picked off by hand, and the fruit on the cotton plant is also removed.

Mr. BUCHANAN. All of it?

Doctor HUNTER. All of the fruit, getting the remaining hibernated weevils, those that have come over from last year and cutting off the brood for next year for that season by picking the progeny, eggs or grubs in the squares. The third step is to apply a poison to the plants immediately after they have been stripped of the fruit, the idea there being to get such straggling weevils as have missed the process of hand picking.

Mr. ANDERSON. Do the fruits set again after being picked off these cotton plants?

Doctor HUNTER. Yes. The process in Florida shows that this plan of stripping the plants has a remarkable effect in accelerating the process of fruiting a little later.

Mr. BUCHANAN. That would depend on the character of land. It might facilitate its going to stalks. On some lands it would be very injurious—on rich lands.

Doctor BALL. This new method has been very successful under the Florida conditions, that is, conditions in which they raise a relatively small amount of cotton per acre. On account of the low cost this is a method that appeared to be peculiarly adapted to areas that have smaller production.

Mr. ANDERSON. I think it would be somewhat expensive to go around and pick off the bugs and fruit.

Doctor HOWARD. It costs about \$1.50 an acre.

Mr. BUCHANAN. The reason that is not so expensive is that a cotton plant about that high (illustrating) will have 1 or 2 squares of fruit on a stalk and a person can go along with a sack and pick them off.

Doctor HUNTER. One hand picks easily over an acre a day.

Mr. BUCHANAN. Oh, yes. There would only be 1 or 2 squares on a stalk. They do not look at these squares to see whether there are bugs on them, but just pick off anything in the squares. These squares are supposed to have been punctured by the weevils which

have come out of hibernation. The only question in my mind is that they will have to strike the field at the right time or the next square will be punctured, too. It would not be more than three or four days until another square would come on.

FOR INVESTIGATIONS OF INSECTS AFFECTING FORESTS.

Mr. ANDERSON. Now please take item on page 209.

Doctor HOWARD. An increase of \$5,000 is asked for there, Mr. Chairman, of which it is proposed to spend \$2,500 in experimental work and methods of preventing losses from timber-boring insects; the other \$2,500 for shade tree protection. I have no argument to make beyond the mere statement that the funds are required for the work proposed.

Mr. ANDERSON. Is there any emergency existing in this timber-boring matter?

Doctor HOWARD. Nothing special.

Doctor BALL. It is a subject that has been almost neglected. The timber is growing rapidly in value. There is a possibility of using methods which could not have been employed when the stumpage was cheap. So there is an opportunity now to save timber that could not have been saved heretofore.

FOR INVESTIGATIONS OF INSECTS AFFECTING TRUCK CROPS, ETC.

Mr. ANDERSON. On page 211 you have an increase?

Doctor HOWARD. There is an increase there of \$13,000. The first two expenditures under that increase will be \$4,000 in the investigation of pea aphid injury to cannery peas. And one of \$3,000 to the new Irish potato weevil in Mississippi. Mr. Graf who has just come from a pea aphid conference, will be able to explain those items.

PEA APHID INJURY.

Mr. GRAF. The pea canners recently had a meeting at Chicago, and requested the Bureau of Entomology of the department and the entomologists of the interested States to attend this conference and tell them about the control of pea aphid. The insect has been injurious in this country for about 20 years, and in that time several remedies have been tried out, with the result that nicotine has become the accepted remedy. The cost of nicotine on cannery peas has been so great that most of the canners, or growers who are growing the product for the canners, would rather take a chance of getting part of their crop through without treatment than the spending of a large amount of money for treatment in the fields.

The treatment of cannery peas by either spraying or dusting is very difficult where they have been broadcasted. Some experimental work was attempted this year in cooperation with the State of Wisconsin, using the newly prepared nicotine dust. The results are of scientific value in showing the possibilities of this remedy, but not enough has been done to show its practical possibilities.

The pea aphid is the most difficult aphid to control with either spray or dust.

The plan for next year's work, which has been approved by the canners and by all the entomologists attending the conference, was to

carry on cooperative work in Wisconsin with the Wisconsin Experiment Station, principally along the line of adapting remedies for use in cannery fields. The larger part of the work would be carried on in Wisconsin, although the surrounding States—Indiana, Illinois, Michigan, and Minnesota—are planning to give all the cooperative assistance possible.

Doctor HOWARD. How about the California work on this same proposition?

Mr. GRAF. The California work will be continued, but the situation is entirely different in the West. Peas are planted in rows and can be treated with sprays. Some additional biological work will be done in an attempt to discover the source of infestation in the spring. Apparently in the Middle West the aphids must migrate from wild food plants to the peas. In California they are apparently present on the pea plants just as soon as they come out of the ground and breed up slowly, and the work in California will be largely an attempt to determine if there is not some hope of stopping the early infestation and thus let the peas get enough of a start so a crop may be grown with few or no insecticide treatments.

COST OF TREATMENT PER ACRE.

Mr. ANDERSON. What is the cost of treating an acre of peas with the nicotine dust?

Mr. GRAF. Rowed or broadcasted peas?

Mr. ANDERSON. No; broadcast. How do you do it?

Mr. GRAF. That is a difficult question. It is just about impossible to spray these fields with our present equipment. In the case of dusting, one can use a duster mounted on an automobile truck and equipped with a canvas trailer to hold the dust in the plants long enough to kill the aphids. This is the reason we are working on dusts more than other remedies.

I should say that spraying the broadcasted peas would cost about \$4 to \$6 an acre and would hardly be effective on account of being a downward spray instead of underspray.

Mr. ANDERSON. Will this dust get down underneath so as to kill the bugs underneath the leaves?

Mr. GRAF. Yes, sir. We have had very good results so far as the killing goes. The only sticking point has been the cost thus far. This canvas trailer is fastened to the rear of the truck, and it also serves to drag many of the aphids out of the plants and drop them down on the ground, where they are readily killed by the dust.

The strength of the wind at the time of dusting is an important consideration. If the wind is too strong, it sweeps all of the dust out of the plants before it has time to kill the insects.

POTATO WEEVIL IN MISSISSIPPI.

The other item covers the new potato weevil in Mississippi. This insect was discovered last spring.

Mr. BUCHANAN. The Irish potato?

Mr. GRAF. Yes, sir. It only exists, so far as we know now, in about 100 square miles in south Mississippi. One of the growers found that his tomato and potato plants were being entirely destroyed. He could not find the insects causing this injury, since they feed only at night and hide under clods or trash in the daytime.

They are entirely different from any insects we have on either of these plants at the present time. It is apparently the same as the tomato and potato weevil proving so destructive in Australia, and this is the only place it has been reported in the United States.

Mr. BUCHANAN. Is it a worm?

Mr. GRAF. No; it is a beetle. But the grub also feeds at night, like the beetle, and hides in the daytime.

Mr. BUCHANAN. It is like the old bean worm?

Mr. GRAF. No. Eradication was first considered but this was dropped on account of the difficulty in finding the insects. This small appropriation is just to start the cooperative work with the State of Mississippi to try to learn something about the insect so remedies may be developed.

Mr. BUCHANAN. The probabilities are that that insect will not thrive in the cold potato climate in the United States, if it comes from Australia.

Mr. GRAF. It is difficult to foretell how injurious an insect may become.

Doctor HOWARD. He does not come from Australia, Mr. Buchanan: it is a curious thing that they were imported into Australia from South America. The insect is a native of the slopes of the Andes in Peru and Chile, and probably was a direct importation from South America, probably in ship supplies in some ship landing at a Gulf port.

Mr. ANDERSON. Do they raise many Irish potatoes down there?

Mr. GRAF. No, sir. It has just appeared on some of the smaller plantings and is not yet in any important potato producing district.

Mr. ANDERSON. Do they raise tomatoes?

Mr. GRAF. Not in large quantities, but large plantings exist at Crystal Springs within easy reach.

Mr. ANDERSON. Do you know in how large an area it infests?

Mr. GRAF. We do not know much about that. It was found in about 5 or 6 towns. I would say offhand that about 100 square miles are infested. The difficulty of inspecting makes it impossible to furnish an exact statement of its occurrence.

Mr. ANDERSON. Does it spread rapidly?

Mr. GRAF. We do not know anything about it.

Doctor HOWARD. There are other portions of that \$13,000 not yet explained. The \$3,000 to be spent in textile fibers, and \$3,000 on low temperature studies as to the life of moths in furs and the life in cold storage. If you wish any further information, Mr. Beck will tell you about it.

TEXTILE FABRIC STUDIES.

Doctor BECK. Textile fabrics relates to the work of the injuries by moths to manufacturers of upholstery and other fabric manufacturers. such as those who put out these mohairs, and besides, the silk mills throughout the country and woolen manufacturers, and all those who store raw wool.

During the past two or three years we found that there had been a considerable amount of damage to raw wool in storage by these moths. But the demand for information from the fabric concerns has increased considerably this last year on account of the development of chemicals for moth proofing fabrics, the attempt being to

moth proof fabrics by giving them a treatment before they go out to be made up into clothing, and we have spent a good deal of time so far this year in determining what effect these treatments have. We have been doing it by taking money from certain other appropriations.

We have found that there are some treatments—one treatment consists of a combination of aluminum salts and electricity, which seems to be very good; and another one which is less promising but being advertised considerably by certain firms.

So far we can not carry on this work satisfactorily. We ought to make a thoroughgoing study of all these tests—a thorough biological study, and study of control methods.

LOW TEMPERATURE STUDIES.

Low temperature work has chiefly to do with the value of cold storage protection of foodstuffs. The development of cold storage has, of course, been phenomenal in the past few years, but the department has not the information it ought to have to tell cold storage firms or brokers or farmers who handle large stocks just how long they would have to keep their commodities in cold storage before they can issue those stocks and guarantee them to be free from living insects.

Beans and peas are in cold storage now, and we are frequently asked how long to permit them to stay in cold storage at 36° before we can guarantee the bean weevils to be killed. We have found that information now, but the last call was from the dried-fruit industry to find out how long these "Sun Maid" raisins should stay in cold storage at 32° before the insects in them are killed. Of course, it is an expensive treatment—cold storage—and they would like to remove them from cold storage as soon as they can. Now, practically, they are held in cold storage throughout the summer, just to protect them from the insects.

Mr. ANDERSON. How long does it ordinarily take?

Doctor BECK. Well, in connection with the insect for dried fruit, we have not any idea, but judging from the work that has been done with other insects, we think that at 32° the majority of the insects ought to be dead in about three weeks. Other forms, which are much more insistent, we have not information on. The big warehouse companies want information on the length of time they must keep the clothing—furs—in cold storage at various temperatures before the moth is killed.

We found, in connection with that, that full-grown clothes moth will live—may remain alive—in cold storage one and a half years, and come out in fairly thrifty condition.

Mr. BUCHANAN. What temperature kills them?

Doctor BECK. That is what we are trying to find out. We know that many of them will die at temperatures averaging in the vicinity of 40, but we have had a good many in cold storage here in Washington for one and a half years at a temperature ranging from 26 to about 50 and down, but averaging about 36. It is a very interesting piece of work, and the information will be very practical to all persons interested in the cold-storage concerns.

FOR INVESTIGATIONS AND DEMONSTRATIONS IN BEE CULTURE.

Doctor HOWARD. The next is bee culture, Mr. Chairman, in which there is no increase requested.

The work of this section is chiefly concerned with investigations of problems of importance to practical beekeeping. All beekeeping practices rest on a knowledge of the behavior and physiology of bees and as a result the investigation of the office follow these two main lines. A detailed study is being made of the temperature and humidity of the colony throughout the active period of the year, as influenced by external factors, comparable to the work done a few years ago for the winter period. The work on wintering revealed the desirability of certain important modifications in beekeeping practices, and the work for the active season was undertaken in the expectation that it also would yield important practical results. It is too early to report the exact bearing of this work on beekeeping practice for this part of the year, but it is evident that it will furnish explanations for certain phenomena now observed but not understood. A study is being made of the factors influencing the rearing of brood in the colony in the early part of the year. One of the most important problems of the beekeeper is to get the population of the colony to the highest possible point before the heavy secretion of nectar begins and this study is undertaken to determine what factors influence this increase. From the information gained it is expected that detailed information will be available to the beekeeper which will enable him to have all his colonies to the desired strength at the right time. If this can be accomplished it will materially increase the production of honey per colony and thus decrease the cost of production.

In connection with the study of wintering it was found that certain honeys cause an abnormal condition of the bees, commonly known as dysentery. To determine the exact cause of this condition a series of experiments was undertaken to determine the utilization of various carbohydrates by the bees. It has been found that the dextrins in honey are the chief cause of this trouble, and as these substances are found to a dangerous degree only in the darker honeys, it is possible for the beekeeper to prevent this condition merely by examining the color of the honey available to the bees during the winter, as in case it is dark to supply the bees with a small amount of sugar syrup after all gathering of nectar has ceased. A change in the behavior of the bees in storage in the fall which has been observed makes it possible to prevent dysentery without removing the dangerous honey from the hive, but merely by supplying a better food for the period of the winter, leaving the less desirable honey for spring use, when it is entirely safe. This will remove a serious source of winter loss which was not fully controlled by the usual winter care advocated by the publication of the bureau.

A study has been made of the colors of honeys from various sources for the purpose of furnishing information on which adequate color standards for honey may be defined. This will prevent the confusion which is now so often experienced in the wholesale selling of honey.

The disease of bees still demands attention. Special work has been done recently to determine whether the Isle of Wight disease is present in the United States. So far it has not been found, and

on the basis of these findings Congress has passed a law prohibiting the importation of adult bees into the United States. The search for this disease will be continued to make sure that the disease is not present. Work on the factors influencing the attack of American foul brood on the bee larva has been made during the past year, which for the first time explains the time of the attack. The environmental factors which permit the attack of Europe on foul brood have also been determined.

Detailed instructions for the gathering of the maximum honey-crop have been prepared and published for three of the main honey regions of the Eastern States, the clover, buckwheat and tulip-tree regions. It is expected that such work may profitably be done for other bee-keeping regions of the country, thus making the recommendations of the department more specific for the various parts of the country.

The demonstration work in beekeeping has been reduced, the work having been turned over to the several States as soon as they were able to continue without the help of the bureau. Work is now being continued in only three States. This work has resulted in a great advance in beekeeping in various States and has been a most profitable line of work.

The work in bee culture deals with those problems which most closely affect the beekeeper in maintaining his production. Following the recent decline in prices of honey, the beekeeper is in need of specific assistance in order to prevent a loss of the increase in honey production which occurred during the war. The work now under way is chosen so as to be most serviceable in maintaining this growing branch of agriculture.

FOR INVESTIGATIONS OF INSECTS AFFECTING CITRUS AND OTHER TROPICAL AND SUBTROPICAL PLANTS.

Mr. ANDERSON. What is the next item?

Doctor HOWARD. There is no change in the next item, but we suggest taking out the item of last year of which \$10,000 will be immediately available for camphor scale.

CAMPBOR SCALE INVESTIGATIONS.

Doctor QUAINANCE. Camphor scale was discovered two years ago in New Orleans in the shade trees on the streets and in the parks. It has since been found in Mississippi at four places in which it has been believed to be eradicated. But it is also found in the citrus belt of Alabama, Mobile, and Grand Bay, the Satsuma region. The Satsuma industry in that territory is developing very rapidly. The scale seems to have come over on shipments of commercial nursery stock from Japan direct about 1911 or 1912, and has gotten quite a start in a few orchards. It kills the small twigs of the citrus trees, but especially incrusts the fruit, so that the fruit should not be marketed. It is practically worthless if the scale occurs in any quantity. We had a hearing to-day before the Federal Horticultural Board as to the advisability of Federal quarantine on this scale.

We are having the fullest cooperation with the States involved—Louisiana, Mississippi, and Alabama. The citrus industry of Florida, Texas, and California is much exercised over this insect and has put in force effective quarantine measures.

The insect attacks some 150 different sorts of trees and plants, including a good many of economic importance, as the Japanese persimmon, the pecan, rubber plants, roses, peach, plum, and the like. We do not know, along with its further spread, whether it will become an important pest in the Georgia peach belt or not. The insect is too new to enable us to surmise what it may do.

We have a laboratory in New Orleans where the insect is being given careful consideration, as a study of its parasites, its methods, and rate of spread. Experiments are being made in the New Orleans territory and also in the citrus area in Alabama with sprays and other methods of control.

We can report distinct progress in our knowledge of the insect itself and progress in developing control measures.

Mr. BUCHANAN. What does it attack?

Doctor QUAINANCE. It attacks many kinds of plants——

Mr. BUCHANAN (interposing). No, no; does it attack the limbs or the fruit?

Doctor QUAINANCE. It attacks the twigs and leaves and fruit of certain fruit-bearing plants at least. It is especially noticeable in camphor trees. It attacks the small branches, which die very quickly. It first was discovered by reason of injury to these trees in New Orleans. Our men working in Japan are going to send us some parasites from Japan if possible. They have one or two now under cultivation.

Mr. ANDERSON. Are there any developments under this item worthy of note at this time?

FOR ADMINISTRATIVE AND MISCELLANEOUS EXPENSES.

Doctor HOWARD. I think not. The next is general administrative expenses—no increase.

FOR PREVENTING SPREAD OF MOTHS.

Then comes page 211, preventing spread of moths.

Mr. ANDERSON. There seems to be a slight reduction.

Doctor HOWARD. It is reduced from \$600,000 to \$531,000.

Mr. ANDERSON. I think you better tell us something about the status of this moth proposition.

GYPSY AND BROWN-TAIL MOTHS.

Mr. BURGESS. The gypsy moth and brown-tail moth activities have been carried on along the same lines as during the previous year, with the exception that some foreign work has been attempted to bring in parasites to work on these species. As you know, the work is divided into three sections. One section handles the scouting and border work to determine the area that is infested and to carry on clean-up work along the border territory. Practically all of that work is done in New England, with the exception of the work that is done in New Jersey, where the moth was found a little over two years ago.

The New England work along the border was held up for a time last spring because our funds were very low until the appropriation passed, and then the force was increased as rapidly as possible, but injury resulted before that work could be resumed.

The New Jersey work was continued throughout the winter and very good results have been secured.

Mr. ANDERSON. Is the New Jersey business on an eradication basis?

Mr. BURGESS. Yes, sir. Only a few hundred caterpillars were found last summer and the scouting work this fall has not progressed far enough to give a good idea of what will develop, but we do not anticipate as much infestation as there was last year.

ACTIVITIES IN NEW JERSEY.

Doctor HOWARD. Let me interrupt you long enough to ask Doctor Ball to give his impressions of the clean-up in New Jersey.

Doctor BALL. That was one of the most surprising things I have ever seen in the insect line. There was an area there in which they had killed practically every tree over a large district, and were depleting the trees around there in a greater circle.

The moth had spread for nearly 200 square miles, and they started in a year ago, and when they sprayed the first time there the caterpillars fell off and just practically covered the ground, just made a bed of caterpillars on the ground, and this year they could not find caterpillars enough to feed the parasites on the whole area. Of course, this eradication in New Jersey, as we have told you all the time, is a hopeful proposition, but not an absolutely sure one. I feel very much more hopeful of it than I did before; and unless everything at the present time is deceptive the outlook is good.

Mr. ANDERSON. Do you continue the spraying just the same when you find the caterpillars or not?

Mr. BURGESS. The operations in certain areas depend on scouting work done in the winter, and if we find infestation in a locality during the winter, we spray that locality and a good belt surrounding it.

Mr. ANDERSON. Are you pretty certain to find them, if they are there?

Mr. BURGESS. Reasonably certain.

Doctor BALL. If they were there in any numbers, they would be found.

Mr. BURGESS. If they are in any way numerous, we would find them. There were also in New Jersey eight outlying small colonies that came as a result of shipping trees from these badly infested areas before the infestation was known. Those have been cleaned up, and no infestation was found in those areas last year or this year. We will follow up the scouting of those areas another year to check up so as to be sure.

There were also three areas where infestations went from that main area into New York State, and those have been cleaned up in a similar way.

INFESTATIONS ON LONG ISLAND.

Aside from the New England and New Jersey areas, there are two small infestations on Long Island that have been given very careful consideration this year. I might say, however, that we depended to a large extent in these infestations on spraying this spring, and we had a very unfavorable season for spraying. There was a great deal of rain and we did not accomplish as much by

spraying this spring as in an ordinary year. The results have been reasonably good in those sections, however. But we expect to find some infestation there this fall and will have to follow the matter up.

METHODS USED IN EXTERMINATING INSECTS.

Mr. ANDERSON. Where did you say you depended on spraying? Do you use any other method?

Mr. BURGESS. We destroy the egg clusters where they are found, and the egg cluster is about as big as a quarter of a dollar, a buff-colored patch, laid on the under side of the branches or tree trunks at the foot of the trees. It is treated with creosote whenever found. We do not scrape them from the trees, because if we did we would scatter the eggs, but they are treated right on the tree surface with creosote, so that they are killed completely.

Mr. BUCHANAN. One treatment kills a cluster, does it?

Mr. BURGESS. Yes, sir. The scouting in New England developed an increase in area in the southern part of the territory, Connecticut and in the Massachusetts; and with very nearly the same area infested in Vermont as in the previous year. The infested area in New England on the western border, the new area, is very lightly infested, and we are carrying on scouting and clean-up work in a strip approximately 25 miles wide from Long Island Sound, up through Connecticut, Massachusetts, Vermont, and New Hampshire.

Mr. ANDERSON. You do not do any spraying except along the border in the New England section?

Mr. BURGESS. No, sir. And then in the areas where there is the greatest likelihood of infestation by wind spread, exposed areas where the caterpillars might blow long distances, and a great deal of the work there in these lightly infested areas can be done by creosoting. There have been this fall two towns in New York State over the Massachusetts border, in one of which there was a cluster found and another one in which two egg clusters were found, New York State is very much interested and very much concerned as to what the future developments are going to be.

QUARANTINE WORK.

Another branch of the work consists of quarantine work. All of the infested territory in New England is held under Federal quarantine, and all products likely to carry the moth to other parts of the United States must be inspected before they proceed.

The New York and New Jersey areas are held under quarantine in cooperation with the States; the areas are so small that it is possible to handle them by an arrangement with the States. It has been done in that way and very satisfactory results have been secured.

Doctor HOWARD. The committee will be interested in hearing you cover the brown-tail moth situation.

Mr. BURGESS. I will speak of that shortly. The experimental work covers different lines of work, designed to develop better field methods and to bring in and disseminate the natural enemies of the gypsy moth. A great deal of work of that sort along the parasite line was done a number of years ago, and we secured from Europe and from Japan some of the most conspicuous and easily collected parasites. They were brought into New England and have been

liberated in different localities in the infested area. Their life history has been studied, and we have attempted to take every advantage possible of those natural enemies in helping to reduce the trouble.

Mr. ANDERSON. Can you tell us anything about whether they have any effect or not?

Mr. BURGESS. Oh, yes. That is checked up, and we can get a very definite line on the effect of the parasites that attack the eggs, because we can make a collection of a definite number of egg clusters. We know definitely the number of eggs and we can determine definitely the parasitism of the eggs. But it is a good deal more difficult to determine the benefit that is derived from parasitism of the caterpillars, because in a good many of these cases parasitism is likely to be quite local, and there are some species that may be very abundant in one locality and may not be in another.

The parasitism has increased, and there are some elements, such as the effect of extremely cold winters that reduce the number of egg clusters in different years. But, unfortunately, the egg clusters that are protected by snow or ice are not killed off by the extremely low temperature.

As I said, the most easily collected parasites from abroad have been secured and brought in, but there are some others that we have records of that are apparently abundant only at special times—that is, when the gypsy moth is particularly abundant in some localities—and those are species that we would like to bring in, because we want to get all the help that we possibly can, and for that reason work was taken up this summer in Europe and in Japan along that line and some interesting information was secured. One shipment of parasites was sent over from Japan; it is the most difficult to bring those living things through in good condition; owing to failure in the proper icing between Seattle and Boston the greater portion of the individuals in the shipment died. But we did secure some breeding stock, and it has been placed in the field, particularly in southern Massachusetts and Connecticut. We also sent some down to New Jersey. We have made it a point in that New Jersey work to send parasites from New England down into that section, particularly those parasites that can maintain themselves on other hosts besides the gypsy moth.

They will not only be beneficial in curtailing the increase of the caterpillars, but if there are stray caterpillars of the gypsy moth, it will give the species a chance to do some good work and help along the field work, that we are trying to do.

PROGRESS ON THE EXTERMINATION OF BROWN-TAIL MOTH.

Doctor Howard spoke about the brown-tail moth. We have done some work on that insect. The maximum area or spread of the brown tail moth was in 1914. It was in about half of Maine, three-quarters of New Hampshire, one-half of Vermont, three-quarters of Massachusetts, the whole of Rhode Island, and one-third of Connecticut, also a small section at the end of Long Island. This year our record indicates that there has been a great reduction, from year to year, which amounts to 67 per cent of the area, based on the maximum for the year 1914.

Mr. ANDERSON. What is the brown-tail moth?

Mr. BURGESS. The brown-tail moth is a moth that came over from Europe. It is abundant in Europe.

Mr. ANDERSON. Where is the infestation here?

Mr. BURGESS. It is entirely confined to New England, and at present it is known only to occur in Maine, New Hampshire, and Massachusetts. There are no infestations known at present in Vermont, Connecticut, Rhode Island, or Long Island, so we feel that progress is being made with that insect.

Doctor HOWARD. Those insects are mentioned together in this item relating to moths. We have only two more headings in the back of the book.

Mr. ANDERSON. You are providing here a reduction of \$69,000. What is the basis of that reduction?

Doctor HOWARD. The fact that you gave us \$100,000 to be made available last year, and we did not use all of it, and it went in as \$550,000, and the Budget Bureau scaled it down.

PREVENTION OF SPREAD OF EUROPEAN CORN BORER.

Mr. ANDERSON. We will take up now the item on page 224, the European corn borer.

Doctor HOWARD. We ask for no increase there. The European corn borer spread into Rhode Island and Maine this past year and made a slight spread along the southern border of Lake Erie, but the work we are carrying on is the same as last year, and I do not know if you want any further word on it or not.

Mr. ANDERSON. I would like to know what the status is now.

PROGRESS OF WORK.

Mr. WALTON. This small scale map shows distribution of the corn borer. The situation in the western end of this infested area is much as it was last year. There has been no important change. There has been very little spread there [indicating on map], although there has been a little spread in contiguous territory.

Mr. ANDERSON. Let us finish with that. What are you doing to confine it to this area?

Mr. WALTON. We are enforcing interstate and intrastate quarantines.

Mr. ANDERSON. How is that carried out?

Mr. WALTON. This work is carried out by the inspection of all crops except corn, which is not permitted to move outside of the infested area in any circumstances, except in shelled condition. That quarantine, of course, is applicable to the entire infested area.

Mr. ANDERSON. What is being done in the area to destroy the insect?

Mr. WALTON. Very little is being done. The Ohio State people are carrying on a campaign of education to induce farmers to adopt methods which will reduce infestation. This is so very slight at the present time that it is difficult to get farmers to do work which seems to them to be unnecessary. There is a very great difficulty there which will be hard to overcome.

Doctor HOWARD. They do not realize the danger, because there is no commercial damage.

Mr. WALTON. There is no commercial damage there at all at the present time.

Mr. ANDERSON. There are very few infestations?

Mr. WALTON. There are very few infestations; yes, sir.

Mr. ANDERSON. Are they scattered?

Mr. WALTON. They are scattered; yes, sir. The infestation, as a rule, does not run heavier than 1 per cent in a cornfield, that is, 1 caterpillar in 1 stalk in 100, a very slight infestation, and it is almost impossible to find it.

INSECT SPREADING.

To go on with the distribution of the insect, there has been a general spread to the northeastward, in the general direction of the prevailing wind. Most of this has been in contiguous territory. There has been no commercial spread, or long jumps, but a spread by flight of the moth to the north and northeastward.

In the western end it is negligible, but in the western end of New York there has been a considerable spread from the west, extending to the eastward edge of Wyoming County. The spread there this year equals the entire area of infestation that had occurred during previous years.

Mr. ANDERSON. Is the infestation there light?

Mr. WALTON. Yes; but it is not as light as in Ohio and Michigan. There is some apparent injury, for instance one shipment of sweet corn was taken to a canning factory which had 7 per cent of the ears infested, but that was from a single farm.

Mr. ANDERSON. What would you do in a case of that kind?

Mr. WALTON. Well, they rejected his corn.

Mr. ANDERSON. That did not kill what was in it.

Mr. WALTON. There is no way of killing it when it gets in an ear of corn, except taking it out and smashing it, but the commercial injury is so slight it is hard to get farmers to act. The New York people are doing what they can in the way of education, and we are receiving active cooperation from the State people, the New York and Massachusetts people.

In the eastern area of the infestation in New York—that is shown by this red area—the injury is very slight indeed, although the insect has been there for a good many years. These areas, you understand, are areas of one generation of the insect, one generation per annum.

Mr. ANDERSON. When you say “these,” what do you mean?

Mr. WALTON. Eastern New York, western New York, this corner of Pennsylvania [indicating on map], the northern part of Ohio, and the southeastern part of Michigan.

Mr. ANDERSON. Is that only 1 year old?

Doctor BALL. One generation in a year, and over in Massachusetts it has two.

Mr. WALTON. I was going to say that it had two generations in Massachusetts, so that the insect increases twice as fast in the New England area as it does in these other areas.

Doctor HOWARD. There is extraordinary damage in New England this year, is there not?

INJURIOUS TO GARDEN CROPS.

Mr. WALTON. In New England we have a great increase of injury to garden crops. At the time this infestation began in New England, not when it began, but when it was discovered in 1917 and 1918, there was a great deal of early sweet corn raised in the eastern New England area, and as the injury by the insect increased, farmers began to discontinue growing it, because it was unmarketable, and the consequence has been that the corn borer entered these other crops—celery, beets, beans, and rhubarb—and at the present time the infestation in these crops is very heavy. There has been a good deal of commercial injury this fall.

Doctor BALL. Tell about the injury to corn.

Mr. WALTON. The injury to corn was so heavy that the sweet-corn farmers have practically ceased producing it, except for local consumption.

Doctor BALL. Tell about the injury to corn in Canada.

Mr. WALTON. Well, we had not been discussing the Canadian infestation. That is outside of the United States.

Mr. BUCHANAN. I would like to know what damage it does where it has a foothold.

Mr. ANDERSON. Please finish with the New England business first.

Mr. WALTON. I was about to say there has been a great deal of spread in New England this year, because of the densely infested condition of the older territory. There has been no clean-up there for two years.

Doctor HOWARD. The weed areas are full of them.

Mr. WALTON. The weed areas are full of them, and there has been a great flight of the second generation moths, which occurs during the last week in July and in early August, and the insect spread up the Merrimack Valley to the center of New Hampshire, and they have flown along the Maine coast for a long distance. There is the heaviest infestation in Massachusetts and New England this year that ever has existed.

Mr. ANDERSON. Is there any clean-up work, or anything in contemplation there?

Mr. WALTON. The commissioner of Massachusetts is endeavoring now to secure funds for that purpose. He thinks he can get \$100,000, but he wants the Federal Government to help him.

Mr. ANDERSON. Is the Federal Government doing any clean-up work at all in Massachusetts?

Mr. WALTON. It is doing no clean-up work in Massachusetts. The funds are insufficient for that purpose.

Mr. ANDERSON. You are merely attempting to maintain a quarantine?

Mr. WALTON. We are merely attempting to maintain quarantine, scouting and limiting the area of the infestation.

Mr. ANDERSON. I would imagine the clean-up of the area in which the weeds and crops are infested would be a very difficult matter.

Mr. WALTON. Yes, sir. It does not mean eradication. It means a reduction of the intensity of the infestation to perhaps reduce this great migration of moths.

Mr. ANDERSON. Has any method been worked out by which that can be accomplished?

Mr. WALTON. Yes.

Mr. ANDERSON. Is it practical?

Mr. WALTON. Yes; it is costly, but it can be done.

Mr. ANDERSON. Please tell us what it is.

Mr. WALTON. Burning over the weed areas at the time when the weeds are in a dry condition. That can be done.

Mr. ANDERSON. Are those weeds burned with an oil burner?

Mr. WALTON. Yes; they are burned with oil burners, and there also has to be a fire protection to control the fire after it gets started.

Doctor BALL. It could be done if they went at it in a commercial way, but the destruction of weeds would be cheaper by a chemical process. Burning the weeds will often increase the crop the next year. If we do it by chemicals it would eliminate that.

Mr. ANDERSON. Can they destroy it with chemicals?

Mr. WALTON. Yes; sodium arsenite is used, which is very effective.

INFESTATION IN CANADA DANGEROUS.

As to the Canadian condition, a very intense infestation of the corn borer was discovered near St. Thomas, in southern Ontario, in 1920, and since that time this infestation continued to exist, and became very much more intensified in 1921. There was very severe injury to corn. Some of the flint cornfields were an entire loss. Since then either the insect has spread, or the scouting work has been much more effective, and it has been found that practically the entire southern half of the Province of Ontario is infested with the insect. They have the largest single area of infestation on the American Continent. This year the injury in the center of that area is not so great as was the case a year ago.

Doctor BALL. They cleaned up the cornstalks over the heavily infested area last year.

Mr. WALTON. They cleaned up, and the Canadians believe that a large portion of that reduction of the infestation has been due to delay in planting corn to a certain date, a date beyond which the moths will have died off.

They do not raise much corn for grain purposes. It is largely a forage crop. It is raised for silage. They can delay it when it is planted for silage. Whether or not that would be applicable to Ohio and Michigan conditions remains to be seen. Probably it will not be, except to a limited extent.

POSSIBILITY OF INSECT SPREADING ALL OVER THE UNITED STATES.

Mr. ANDERSON. Have we got a prospect of getting this bug all over the United States in due time?

Mr. WALTON. It looks that way, although perhaps the spread will be slow. In the meantime we are bringing in the natural enemies from Europe. We liberated 1,000,000 of one species in Massachusetts this summer, and several other species, which promise equally well will be liberated later on.

Doctor HOWARD. We are making a more intensive study of European parasites than ever before. At the laboratory in the south of France they are studying the life round of every parasite.

Mr. ANDERSON. Where does this corn borer exist in European countries?

Doctor HOWARD. All along the Mediterranean.

Mr. ANDERSON. Do they raise corn there?

Doctor HOWARD. Yes.

Mr. ANDERSON. Do they raise it successfully?

Doctor HOWARD. Quite successfully; yes. In Italy, especially, the corn borer occurs in almost every cornfield, and does not have an appreciable effect on the crop.

Mr. ANDERSON. Does the spread of the borer vary from year to year under different climatic conditions?

Doctor HOWARD. It does; under different seasonal conditions, you mean?

Mr. ANDERSON. Yes.

Doctor HOWARD. It does, unquestionably. We have records of its damage in Besarabia and Transylvania which show a severe damage; but there is no record of severe loss along the Mediterranean, and we think it is controlled by parasites, and that is the reason we are over there trying to get them and bring them over here and reproduce the entire environment of the insect in this country.

Mr. ANDERSON. In bringing them over is there any danger of bringing bugs that are harmful?

Doctor HOWARD. Quite the reverse. They are so well known in their habits and relations that there is no danger whatever. In fact, it might interest you to know that one of the parasites we brought over for the European corn borer we expect to be a very efficient enemy of the native cornstalk borer in South Carolina, and it is a parasite of the sugar-cane borer in Louisiana, and we have liberated a large number of them in sugar-cane fields in New Orleans this past year, and it will serve, possibly, a triple purpose we hope.

STATE COOPERATION.

Mr. ANDERSON. Will you give us some idea of the prospects of offsetting funds appropriated by the States next year?

Mr. WALTON. I can give you the figures on the amount that the States furnished this year. Perhaps that would interest you. I have no figures on what they may furnish next year.

Mr. ANDERSON. All right, go ahead.

Mr. WALTON. The States furnished this year, for the cooperative work, a total of \$49,700. This is distributed as follows: Michigan \$4,000; Ohio, \$11,000; New York, \$15,000; Massachusetts, \$15,000; New Hampshire, \$2,000; Maine, \$2,000; and Vermont, \$700.

Mr. ANDERSON. They do not seem to be very scared up there.

Mr. WALTON. Either that or they are very poor.

Doctor HOWARD. Massachusetts is thoroughly scared now.

Doctor BALL. It had not been in Vermont until this year, and only in the edge of New Hampshire.

Mr. ANDERSON. Is the amount requested sufficient to maintain the work on your present basis?

Mr. WALTON. Yes; without the conduct of the thorough scouting work in the Mississippi Valley States, which should be done to determine whether the insect is present or not. That we can not do with the present funds. We had to neglect that during the present fiscal year.

Doctor HOWARD. That is done by the State entomologists, to some extent.

Mr. WALTON. Yes; to some slight extent.

Doctor HOWARD. The officials are all anxious about it there, are they not?

Mr. WALTON. Yes.

Mr. BUCHANAN. Have you ever got a parasite that proved a success against any of these injurious insects or bugs, or whatever you call them?

Doctor HOWARD. Oh, yes; a great many times.

Mr. BUCHANAN. That proved a success?

Doctor HOWARD. A perfect success; yes.

Mr. ANDERSON. What do you mean when you say "a perfect success"?

Doctor HOWARD. It absolutely controls the insect

The most famous one is the Australian Lady Bird, to kill off the white scale in California. That scale made its appearance through being introduced accidentally into countries all over the world.

It always caused alarm, and they have sent to California for the Australian insect and it stopped the damage.

I got a letter to-day from south France which says that scale is distributed along the Riviera, and the insect we sent over there to fight has done perfect work.

Doctor BALL. Take our native insects, like the grass hopper. Ninety per cent of the control work is due to parasites. After you have a plague, 90 per cent of the eggs have often been found destroyed by parasites. If it was not for parasites, our native insects would be as serious a pest as new ones, and that is why the new ones are a very serious pest, for they leave their parasites behind them, and are brought in alone. Our native insects, in many cases, are not so injurious, because they naturally developed a sufficient number of parasites to keep them in check.

Doctor HOWARD. I have seen 90 per cent of the eggs of the Army cotton worm destroyed by parasites.

Doctor BALL. You have seen outbreaks of the caterpillar in the northern country that stripped the leaves off the trees. The next year there will not be one, because the parasites wiped them out.

Mr. BUCHANAN. I have seen them to a limited extent. It may be that parasites hold them down.

Doctor BALL. Plant lice are regularly controlled by parasites, and if it were not for these parasites we would not have any plants left at all.

Doctor HOWARD. You refer to imported parasites?

Mr. Burgess has pointed out that the range of the brown-tail moth has been reduced by several thousand square miles, and that is partly due to the work of the parasites we brought over from Europe, from 1905 to 1910. This natural method of control is fascinating, because it is so cheap.

Mr. BUCHANAN. Yes; if we can get it.

Mr. ANDERSON. Take up the next item on page 226; the spread of the Mexican bean beetle.

Doctor HOWARD. Mr. Graf.

CONTROL AND PREVENTION OF SPREAD OF THE MEXICAN BEAN BEETLE.

Mr. GRAF. Any statement we might make on our last year's work with the Mexican bean beetle would be largely a statement of the progress of the insect, rather than of our own. It is still spreading.

Mr. ANDERSON. I think you had better begin at the beginning and give us a history, because we will hear something about it later on.

GENERAL STATEMENT OF WORK.

Mr. GRAF. This insect is probably Mexican in origin. It has been in the Rocky Mountain region, in Arizona and Colorado, for about 50 years.

In 1920 some specimens were found in Birmingham, Ala., its first appearance in the East. The insect was found to be distributed in 13 counties, centering on Birmingham, with an area of about 4,500 square miles. The following year 1921 found it in five States, over an area of 45,000 square miles.

Mr. ANDERSON. What States did you find it in?

Mr. GRAF. Alabama, Tennessee, North and South Carolina, and Kentucky, but the main infestation was in the northern part of Alabama, northern Georgia and eastern Tennessee, with just a few counties in the other States.

At the same time a great many tests were made with various arsenicals in an attempt to develop a control for the insect. It was necessary to work out entirely new dilutions of poisons since humid climate in the East often causes severe plant injury.

Our standard arsenical, lead arsenate, caused a great deal of injury to the plants. We found calcium arsenate and magnesium arsenate were relatively safe; the only trouble with calcium arsenate was that it was unsafe to apply the arsenical strong enough to control the insect. Where many insects are present it is difficult to save the plant with any poison and much additional work is necessary to obtain a safe and sure remedy.

This year the work on insecticides was continued. Scouting was stopped on account of lack of funds and we have no exact idea of the infestation except that it is within about 50 miles of the Ohio River and moving north rapidly.

This blue line [indicating], which shows the infestation for 1922, is very inaccurate, because we depended on correspondence almost altogether. If the insects spread during the past year in the same direction that it spread in the two previous years, it ought to be in West Virginia. We are not saying it is in West Virginia. It has not been so reported, but it is continuing its spread very rapidly.

As far as recommendations for control go, we hesitate to recommend magnesium arsenate, because of its injurious effect on peach foliage.

Mr. ANDERSON. What do you mean?

Mr. GRAF. It caused much injury to peaches. It burns the leaves.

Doctor HOWARD. The peach is extremely susceptible. Is a bean as susceptible as the peach?

Mr. GRAF. It is to some but not to others. We have always believed that the soluble arsenic content of a poison is what causes the damage, but the other chemicals in the insecticide also have some

action on the plant. The lead and magnesium have a great deal to do with it, and it is rather difficult to say a poison will burn one plant because it has burned some other plant.

The bean is supposed to be more tender to arsenicals than a peach, but as far as magnesium is concerned it is more hardy.

We have made arrangements to have magnesium arsenate tested under all conditions this year in the West and North, and should have some additional information on this point soon.

Magnesium arsenate is only manufactured by one company, and it is doubtful if a stable formula has been developed. This work requires many tests in different districts in order to be certain of insect control without plant injury.

The insecticide phase of the question is still largely unsolved. A man was sent to Mexico this year to continue investigations of parasites, and he collected and shipped a large number of the parasites of the Mexican bean beetle from near Mexico City. About 3,000 of these beneficial insects have been received and an attempt will be made to colonize them next year. It is still too early to predict results. This material was carefully watched and all secondary parasites were destroyed.

Mr. GRAF. Secondary parasites are the ones that kill the beneficial parasites.

Mr. ANDERSON. Are the infestations on the edges of this center as heavy as they were in Birmingham?

Mr. GRAF. Yes, sir. One of the most noticeable things is that the most complaints come in from the north boundary of the insects. As it goes further north it is becoming more injurious.

Another thing is the infestations along the southern edge is becoming weaker, but whether it is the level country, the absence of hills for hibernating the insect, or whether the climate is not suitable, is something we can not tell.

Doctor HOWARD. Does it fly away to a distance to hibernate?

Mr. GRAF. In New Mexico, it was found in the woods $7\frac{1}{2}$ miles from the nearest beans; and that is as far as we looked. I would say 20 to 40 miles would be within easy reach.

Mr. ANDERSON. Does it attack anything except beans?

Mr. GRAF. In the East it feeds on all cultivated beans, cowpeas, soy beans, and other legumes, and to a limited extent on the flowering beans, but it is a primary pest only, as we think now, on cultivated beans.

Doctor HOWARD. Does it not affect the wild cucumber?

Mr. GRAF. No, sir; that is another insect. The insect is apparently changing its habits a great deal. We thought we knew something about it after it had been in here a year. We thought it would be possible to grow early beans in Birmingham this year. The Italians tried it the previous year and quit. The beetle was two or three weeks late last year, and some of the people grew early beans successfully. The Italians noted the success and tried to plant a very large crop of beans slightly later and they were all destroyed. In the fall it was expected the insect would be injurious until the 1st of September, but it had disappeared from the fields on the 1st of August, when the weather was very favorable for further development.

We found them hibernating in the woods, under the moss and leaves when the temperature was 82° in the shade, at a time when they had in the previous year caused serious damage.

Doctor HOWARD. Isn't that characteristic of the family?

Mr. GRAF. Most of the ladybirds hibernate early, but they did not do it in Birmingham the previous year. They changed their habits.

PROPOSED ACTIVITIES.

Mr. ANDERSON. What are you proposing to do next year?

Mr. GRAF. We are proposing to continue the work, following it north a great deal more closely. We about concluded from our insecticide tests on beans that it will be necessary to develop a separate formula for beans in different latitudes. We think we can use a stronger poison on beans in the Northeast than in the Southeast. If that is possible, it will be easier to control. It is dangerous to put the arsenate on the plant in a high concentration; that is, high enough to kill the insect—at the present time. We planned to do some work in the West, but it appears that part of the appropriation is stricken out, so we can not carry that out.

Mr. ANDERSON. What do you mean "in the West"?

Mr. GRAF. In the Rocky Mountain regions, New Mexico, and Colorado. The beans are a lower-priced crop there. Injury occurs over a short period, and water is so scarce that they can not spray conveniently, and the wind is so high that they can not dust.

Mr. BUCHANAN. He got you there.

Mr. GRAF. He has, unless we can develop some mechanical control.

Mr. ANDERSON. Go ahead in relation to that.

Mr. GRAF. The main producing States of the North are Michigan, Wisconsin, New York, and New Jersey. New Jersey produces mostly green beans; that is, beans for canning, and from the present trend of infestation it threatens these and other States. The States further west will be free a great deal longer than New York and the rest of the States on the eastern seaboard.

NEED FOR INCREASED APPROPRIATIONS.

Mr. ANDERSON. If you had more money, what could you do with it?

Mr. GRAF. We would start work in the West principally on a mechanical control. Those people out there are fighting a hopeless fight. They can not choose their planting time. They have to plant when the moisture is in the soil; they have to plant so as to be sure of avoiding frosts. They have to plant in certain fertile valleys near the surrounding hills, which furnish hibernating quarters for the insects.

There is apparently no way they can avoid having a great deal of insect damage.

The crop value will average in New Mexico about \$12 per acre over the cost of production. That means that direct control with insecticides is just about out of the question. We are trying to figure out a mechanical contrivance to knock some of the beetles off the plants in the course of their cultivating the crop. They cultivate from two to four times a season, and if we could reduce the beetles to some extent, without any extra expense, it might prove sufficient to save

the crop. The beans mature rapidly, and if the beetles are only partially reduced the beans might pass the critical period safely and a commercial crop would be assured.

Mr. ANDERSON. We have had them a long time out there. What can we do to stop them from getting in the bean producing sections of Michigan?

Mr. GRAF. We can not stop them. We have given up the idea of that.

Mr. ANDERSON. What can we do to find out? What can we do when they get there?

Doctor HOWARD. That is what we are doing under this appropriation.

Mr. ANDERSON. Have you money enough to do it?

Mr. GRAF. In the east the work could be expedited with additional funds both as regards the development of remedies and the survey to determine the best localities for growing beans.

Mr. ANDERSON. You feel your work in the east is as effective as you can do it?

Doctor HOWARD. \$25,000 is enough, it seems to me, to follow up our studies, although a larger amount would of course permit more extensive research.

TUESDAY, NOVEMBER 21, 1922.

BUREAU OF BIOLOGICAL SURVEY.

STATEMENT OF DR. E. W. NELSON, CHIEF OF BUREAU.

SALARIES.

Mr. ANDERSON. Is there any preliminary statement you want to make, Doctor Nelson, before you start on the statutory roll?

Doctor NELSON. The work of the Biological Survey has to do with the wild birds and mammals of the country, the general conservation and utilization of the useful species and the control of the harmful ones, including the administration of the Federal game laws.

Mr. ANDERSON. We will take up your statutory roll, on page 229. There seems to be a small increase.

Doctor NELSON. There is an increase of the statutory roll, which is compensated for by a corresponding decrease on the lump fund appropriations; it is merely a transfer.

Mr. ANDERSON. All of these changes involve transfers?

Doctor NELSON. Yes; except two which we dropped as noted on page 44 of this explanatory statement.

Mr. ANDERSON. Then there is a net decrease on the statutory roll?

Doctor NELSON. Yes; of \$2,700 through dropping two clerks; then there is a change of the title of photographer, changing it to photographer or clerk, with no change in salary. Otherwise, the salaries stand as they are for the present year.

Is anything further desired on that item?

Mr. ANDERSON. No; I think not.

MAINTENANCE OF THE MONTANA NATIONAL BISON RANGE AND OTHER RESERVATIONS.

Doctor NELSON. The first appropriation item is that covering game and bird reservations, page 231.

This is for the maintenance of the Montana National Bison Range and other reservations, 69 birds and big game reservations, of which five are mostly, at least, for big game. We have about 40,000 acres under fence. These 40,000 acres are distributed in five reservations. Within these fenced areas we have on the National Bison Range in Montana 462 bison, 325 elk, and 75 deer of two kinds, and 14 mountain sheep. On the Wind Cave game preserve, South Dakota, we have 92 bison, 149 elk, 20 antelope; on the Niobrara Reservation in Nebraska, we have 41 bison, 54 elk; and on the game preserve in Sullys Hill National Park, N. Dak., 11 bison and 50 elk and 5 deer.

A large number of these reservations are without regular warden service. Some of them are so small that they do not warrant it, and as to others the funds available do not permit us to maintain a warden. We have wardens on the more important ones, and in the maintenance of the big game reservations we have the upkeep of resident wardens' quarters and of fences, with necessary repairs. In some places new fences must be constructed to take in unfenced lands as the animals increase in number.

WINTER ELK REFUGE.

In the winter elk refuge at Jackson Hole, Wyo., we have about 2,000 acres of land, largely under fence, where we provide forage for the southern Yellowstone elk herd in the winter. This herd lives in the summer in the southern part of the Yellowstone and adjacent national forests and in winter the animals come down into the Jackson Hole country, in the valley of the Snake River. Formerly these elk used to pass on south into the plains of Wyoming, but that country has been occupied by settlers and by stockmen, and is fenced. At present the elk are stopped when they get down in the foothills, as they have no outlet. The result is that they have insufficient winter range, and in order to keep the elk alive they must be fed hay during severe winters. That is the object of this reservation, where we cultivate about 300 acres of hay land, raising between 600 and 700 tons of hay a year. Occasionally we have to buy additional hay. The elk, in numbers running anywhere from 4,000, 6,000, or more, come down into this valley in winter and are fed during hard seasons.

Mr. ANDERSON. Does this appropriation cover only these five refuges or reservations?

Doctor NELSON. It covers those and the 64 bird reservations.

WARDEN SERVICE.

Mr. ANDERSON. How do you police these bird reservations?

Doctor NELSON. By wardens. At the more important ones we have a warden service.

Mr. ANDERSON. How do you police the ones where you do not have the warden service?

Doctor NELSON. We simply visit them occasionally, and secure the cooperation of the State game wardens. In Louisiana, for instance,

the State game officials have a boat cruising around the mouth of the Mississippi, and as some of our reservations lie off the coast in this vicinity, they have very kindly agreed to help police them during the breeding season.

Mr. HENDERSON. A number of Reclamation Service men are also made deputy wardens without salary.

Doctor NELSON. Yes; the Reclamation Service has men in charge of the reclamation reservoirs, a number of which are bird reservations, and they act as wardens. We get quite a lot of cooperative service of that kind to help out.

Mr. ANDERSON. On these bird reservations, for example, I understand that it is not permissible for a man to have a gun, ammunition, or any other firearms of any sort; is that correct?

Doctor NELSON. That is, you mean the people are not permitted to go on——

Mr. ANDERSON (interposing). Yes.

Doctor NELSON. No; there is no shooting permitted, except at two places——

Mr. ANDERSON (interposing). Not only no shooting permitted, but you do not let them on there with a gun at all?

Doctor NELSON. No; a man is not permitted to go on there with a gun, unless he is a Government hunter killing predatory animals.

Mr. ANDERSON. Is that done by law or regulation of the department?

Doctor NELSON. That is by regulation. The Secretary of Agriculture is authorized to make proper rules and regulations to protect the reservations and to make them fulfill the purpose for which they were established.

Mr. HENDERSON. The law prohibits interference with the birds on the reservations, their nests and eggs.

Doctor NELSON. We do not interfere with the fishing, for instance, as long as it is done according to the State laws. The Big Lake Reservation, which is one of our important reservations in Arkansas and a very great resort for wild fowls during the migration season, is also a very popular fishing ground. There is a lot of commercial fishing there, and we give anybody a permit to fish as long as he complies with the State fishing laws. I might say, in this connection, that the work of our wardens on the Big Lake Reservation has brought about an observance of the State fishing laws of that locality because as soon as a man violates the law we revoke his permit.

This affords a strong incentive for the fishermen to avoid violating the requirements of the State laws.

INCREASE IN GAME.

The big game on these fenced reservations is increasing rapidly. We are now working out a system whereby we can take care of the surplus, and the indications are that there may be a surplus of game to be marketed which eventually will fully take care of the expense of caring for these places.

Mr. ANDERSON. Have there been any apparent increases in the number of game birds?

Doctor NELSON. Migratory game birds, you mean?

Mr. ANDERSON. Yes.

Doctor NELSON. Very great increases. That we will take up later when we come to that item.

Mr. ANDERSON. The next item is on page 232.

SULLYS HILL NATIONAL PARK GAME PRESERVE.

Doctor NELSON. For Sullys Hill Reservation, N. Dak., there is an appropriation of \$5,000, which has been continued for some years, for purpose of caring for this reservation and for making certain improvements needed for its proper maintenance. These improvements are now in an advanced state, and the place is very popular with the residents of the surrounding country. Owing to the fact, of which you probably are all aware, that North Dakota is a rather flat country and here is a little hilly region bordering Devils Lake, with a small tract of woodland on it, it makes a very popular picnic ground and resort for the people of all that region. I am told that they come from as far as 200 miles away to have picnics at this place, and on pleasant days hundreds of people come there. In addition to maintaining the game there we are trying to accommodate the people. We have built a woman's rest house. We are also putting in a little water service, so that the people who come there can get water easily, and a parking place, as well as other simple improvements.

Mr. BUCHANAN. Is this Government land?

Doctor NELSON. Yes; it is owned by the Government.

Mr. BUCHANAN. Do you call that a game reservation?

Doctor NELSON. Yes; it is a game reservation.

Mr. BUCHANAN. What sort of game?

Doctor NELSON. Buffalo, elk, and deer.

Mr. BUCHANAN. Is it fenced?

INCREASE IN NUMBER OF BUFFALO.

Doctor NELSON. Yes. It might be of interest, before I leave this game reservation matter, to state that in the United States at the present time there are nine Government herds of bison containing 1,146 animals. There are also a considerable number of private herds, so that the bison, all told, in the United States number about 3,527. In Canada they have over 6,000, so there are now in existence in North America approximately 10,000 bison, whereas a few years ago they were on the verge of extinction.

Mr. ANDERSON. They are not very far from it yet—10,000 is not very many.

Doctor NELSON. Well, it is enough to be encouraging, in view of the fact that the bison breed in captivity just as freely as cattle. They have increased from a little handful to 10,000 in a comparatively few years, and they are scattered over Canada and various parts of the United States, so that the future of the bison is practically assured. They can be maintained and will be maintained.

Mr. BUCHANAN. Do they get as gentle as cattle?

Doctor NELSON. No; they are rather dangerous. For instance, up in our Montana bison range, where we have nearly 500, they let you ride up to within a short distance of them, but if you get on foot they are likely to come after you, particularly some of the cows.

Some of the old cows are more vicious than the bulls. We have found that on several of the reservations where there are bison the cows are inclined to be more savage than the bulls.

Mr. BUCHANAN. If they were handled properly they would get gentle like cattle?

Doctor NELSON. Oh, yes; they would; they could be made gentle.

FOOD HABITS OF BIRDS AND ANIMALS.

Mr. ANDERSON. We will now take up the item on page 235, investigation of food animals, North America.

Doctor NELSON. The main work under this appropriation is that of control, lessening the losses due to depredations of predatory wild animals, such as mountain lions, wolves and others, on live stock, and the destruction of crops and forage by rodents. There is a great variety of these animals.

PREDATORY ANIMAL WORK.

In our predatory animal work, which I will take up first, we are maintaining an organization throughout the western United States, with an inspector in charge in each State, and under him we have employed hunters who are poisoning and trapping and shooting these predatory animals.

During the last year we actually took the skins or scalps of nearly 31,000 of these animals, in addition we put out an enormous number of poison baits, which, judging from the number of animals subsequently found by stockmen in the ranges, undoubtedly resulted in the killing of more than 50,000 additional coyotes and bobcats.

Mr. BUCHANAN. You do not spend any money on jack rabbits and ground squirrels?

Doctor NELSON. Yes; and later on I will take that up.

Mr. BUCHANAN. All right.

Doctor NELSON. Our men put out 1,229,000 poison baits during the year in their campaigns against the predatory animals, and the number killed was very great. We received from the skins of these animals, which are Government property, \$34,202, which, added to that previously received, make a total of \$283,000 that we have turned into the Treasury for the skins taken by our hunters.

Mr. ANDERSON. How many animals do you say you killed this year?

Doctor NELSON. We actually took the scalps and skins of 30,986, and in addition the use of more than a million poison baits resulted in killing an enormous number of additional animals, of which we get reports from the stock men who find the dead animals scattered over the range. The reports in many places are that the coyotes and other stock-killing animals have practically disappeared, so that stock men are able without losses to run sheep, for instance, in open grazing.

With respect to our work in western Texas Mr. Hudspeth informed me that he considers that the predatory work in that region has added \$5 or more an acre to the value of the land, owing to the freedom with which stock can be grazed. It does not require the same number of herders as when predatory animals are present.

Mr. ANDERSON. Has this work got to be kept up on its present basis indefinitely?

Doctor NELSON. Apparently it has, at least until the animals are destroyed. Just as quick as you stop this work the animals breed back and become so destructive that in many places it puts the stock business out of commission. In northern California, for instance, they had stopped growing sheep in some sections owing to the depredations of coyotes. Since we began working there they have started again to grow sheep, and we have reports from various places that if this work was not being carried on it would be impossible to continue growing live stock, particularly the smaller stock.

COOPERATION OF STATES.

Mr. BUCHANAN. Before we went into that business, some of these States were taking care of themselves. Now, the Federal Government has gone into it, and they just withdraw and turn the whole thing over to the Government?

Doctor NELSON. No; the States are putting up money; for instance, their cooperative funds for 1922 for this work in the States amounted to \$196,405.

Mr. BUCHANAN. Prior to that they had rewards offered at so much per scalp?

Doctor NELSON. Since we have shown the superior effectiveness of the work as we are doing it, many States have ceased to rely upon the bounty system.

Mr. BUCHANAN. That is just what I told you.

Doctor NELSON. I beg your pardon.

Mr. BUCHANAN. That is just what I said, since the Government has taken it up they have stopped.

Doctor NELSON. But they are appropriating money in place of the bounties.

Mr. BUCHANAN. Oh, yes; two or three dozen States appropriate \$100,000, but we appropriate \$502,000.

Doctor NELSON. The \$502,000 is not appropriated for the predatory-animal work alone. For the predatory-animal and the rodent work combined the Government puts up about \$400,000, and the States are putting up approximately \$1,000,000 in cooperative funds. They are contributing practically two-and-a-half times as much as the Federal Government.

EXPERIMENTS AT DENVER LABORATORY.

We have established in Denver a laboratory where experiments are being made in developing an improved type of poison, which is combined in such a way as to make it palatable to predatory animals.

There has been great difficulty in the use of strychnine, which is the main poison, owing to its bitter taste. The predatory animals are very acute in detecting it, and when they take the bait in the mouth and notice the slightest bitterness they drop it. We are working out a method whereby the particles of strychnine are coated and disguised in such a way that the development of the taste is delayed until the animals swallow it, and we are getting exceedingly effective results. We have found that the plan on which we started the trapping of predatory animals requires too large a body of men.

The animals are so abundant and the territory is so vast over which they roam that it would take an army to control them in this way, but by developing the poison method we have already secured encouraging results. These results indicate that with a comparatively small force and with the cooperation of the stockmen and the local people with whom we are working we can cover an enormous territory very much more cheaply. The future control of the predatory animals will be based largely on the increasing effectiveness of our poison campaigns.

Mr. BUCHANAN. Do you run across any species of wolves out there that will not eat poisoned meat, which are too smart for you?

Doctor NELSON. We have not found any yet.

Mr. BUCHANAN. Do you not find those which will not eat meat?

Doctor NELSON. I do not think we have ever run across one that would not take some bait. We have poisoned a number of old wolves.

Mr. BUCHANAN. Loboos?

Doctor NELSON. Yes; that have run for many years.

Mr. BUCHANAN. Some of them are so smart that they will not eat dead meat; it has got to be warm.

Doctor NELSON. These little baits that we put out are fixed up in a tempting way, just a little bit that is dropped, very carefully prepared, and they will pick it up. A wolf that will not touch a dead carcass is likely to pick up one of these baits.

Mr. ANDERSON. How many men have you got employed in this work now in the field?

Doctor NELSON. We have 160 in our regular organizations, and the number runs over 200, according to season.

Mr. BUCHANAN. Two hundred altogether?

Doctor NELSON. About 200.

BOUNTY SYSTEM FOR PREDATORY ANIMALS.

Mr. JUMP. Going back to Mr. Buchanan's question of a few minutes ago, he may want you to put in the record a statement of the observations of the department which have demonstrated the lesser degree of effectiveness of the bounty system in comparison with the system which you are using.

Doctor NELSON. The bounty system against predatory animals has been in vogue ever since the early settlers came to the eastern United States, and it has always been honeycombed with fraud. It gives opportunity for the rankest kind of frauds and it never definitely controls predatory animals, because it is for the interest of the bounty hunters not to exterminate the animals from which they get a return each year.

Mr. ANDERSON. They had to leave some breeding stock?

Doctor NELSON. They did. Our trappers have found many coyotes with a trap mark high up on one leg, showing that they have been caught and freed. A mark high up on the leg of a coyote indicates that that animal has been caught and turned loose; and our men have caught many female coyotes with that mark on them. Many of the trappers have told us that they never killed a female, because that would be cutting off their business.

Mr. ANDERSON. Has this work got to be kept up on its present basis indefinitely?

Doctor NELSON. Apparently it has, at least until the animals are destroyed. Just as quick as you stop this work the animals breed back and become so destructive that in many places it puts the stock business out of commission. In northern California, for instance, they had stopped growing sheep in some sections owing to the depredations of coyotes. Since we began working there they have started again to grow sheep, and we have reports from various places that this work was not being carried on it would be impossible to continue growing live stock, particularly the smaller stock.

COOPERATION OF STATES.

Mr. BUCHANAN. Before we went into that business, some of the States were taking care of themselves. Now, the Federal Government has gone into it, and they just withdraw and turn the thing over to the Government?

Doctor NELSON. No; the States are putting up money; for their cooperative funds for 1922 for this work in the States to \$196,405.

Mr. BUCHANAN. Prior to that they had rewards offered per scalp?

Doctor NELSON. Since we have shown the superiority of the work as we are doing it, many States have ceased the bounty system.

Mr. BUCHANAN. That is just what I told you.

Doctor NELSON. I beg your pardon.

Mr. BUCHANAN. That is just what I said, since they taken it up they have stopped.

Doctor NELSON. But they are appropriating no bounties.

Mr. BUCHANAN. Oh, yes; two or three dozen \$100,000, but we appropriate \$502,000.

Doctor NELSON. The \$502,000 is not appropriate for animal work alone. For the predator work combined the Government puts up. The States are putting up approximately \$1,000,000. They are contributing practically two-thirds of the Federal Government.

EXPERIMENTS AT DENVER

We have established in Denver a laboratory being made in developing an improved method combined in such a way as to make it more effective.

There has been great difficulty in determining the main poison, owing to its being very acute in detecting it. We have to catch the mouth and notice the slight signs of it. We are working out a method where the animals are not delayed until the animals are effective results. We have been successful in the trapping.

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the conservation commission asked us for assistance

a predatory animal service under the State game

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large scale in the northern part of the State. We

e, and the officials appear to be very apprecia-

doing in teaching the State wardens, who are

Montana in 18 years paid about \$125,000 a year, which made an aggregate of about \$2,000,000, and at the end of that period it had practically as many wolves and coyotes as it had at the beginning. The expenditure of that amount of money ought to have killed every predatory animal in the State of Montana.

Mr. JUMP. The bounty hunters also get the least destructive animals?

Doctor NELSON. A bounty hunter can not afford to persist in trying to destroy the very cunning, experienced predatory animals, particularly wolves and certain coyotes, which have become very suspicious and have evaded capture for years. We will, when necessary, keep a man for months on the trail of a notorious stock killer until we get him. There have been bounties offered of \$500 on a single wolf, and the bounty hunter goes in and spends a month or so and quits, because he can not afford to keep after him. But we put one of our men in there, and he follows that animal until he gets him, and in that way we have destroyed in South Dakota one wolf that had a record of about \$25,000 worth of live stock it had killed on the range.

Mr. BUCHANAN. How much was the reward offered for that wolf?

Doctor NELSON. They had offered up to \$500 reward for him.

Mr. BUCHANAN. I have heard of even as high as \$1,000 being offered for a big lobo wolf.

Doctor NELSON. Our men have killed a lot of those notorious old animals; and last spring they killed a big grizzly bear near Williams, Ariz., that had a record with the stockmen of having killed during its life some \$25,000 to \$30,000 worth of stock.

CONTROL OF RABIES.

In addition to hunting the animals because of their destruction of stock there is the control of rabies. Rabies started in the West in 1915, when it spread to five States—northern California, Oregon, Idaho, Nevada, and Washington—

Mr. BUCHANAN (interposing). You do not mean the first rabies started in 1915 in the West?

Doctor NELSON. Oh, no; I mean this epidemic I am speaking of. It became so severe that those five States urgently asked for an appropriation to do something to help control it, and an appropriation was made. We organized the work along the lines mentioned, with inspectors and paid hunters, and before we got thoroughly going rabies had spread into Utah, but we stopped it there, and we have held it ever since.

There have been several outbreaks. Last year there was an outbreak in Washington, and it started to spread again, but we concentrated hunters there and suppressed it. What we do is concentrate a lot of hunters with traps and poison to kill the predatory animals. In that way we clean up the animals which serve as carriers of the disease in that district, and that stops the spread of the rabies.

Mr. BUCHANAN. Wolves, principally?

Doctor NELSON. Coyotes and wolves; yes. But every carnivorous animal has it—skunks have it, cats and dogs have it, and they pass it on to cattle, sheep, and horses, all kinds of live stock.

Mr. BUCHANAN. If you kill out the jack rabbits, you will not have any remedy for rabies—any cure?

Doctor NELSON. Why?

Mr. BUCHANAN. We use the jack rabbit in order to cure it.

Doctor NELSON. We use poison; that cures it.

Mr. BUCHANAN. Oh, no; poison does not cure a man or a person who is bitten, who contracts rabies.

Doctor NELSON. That is cured by the Pasteur treatment.

Mr. BUCHANAN. They use the jack rabbit for that treatment.

Doctor NELSON. In this outbreak I have just spoken of, which we have suppressed, there is an official record of 2,154 people that have been bitten by rabid animals in that territory, 59 of whom died. The way it was going the disease would have spread over the entire Rocky Mountain region, and unless it has been successfully headed off the number of people bitten and the losses would have been tremendous.

Mr. BUCHANAN. Do you know it is the last thing in the world when we lose a case of rabies if the person will go to the institute right away?

Doctor NELSON. I know it. The trouble is that people have a little wound, and they do not think anything of it, and they let it go until it is too late. But they have learned their lesson in this territory, and they do not lose any time in getting to a place where they can be treated.

WILD ANIMALS COMING OVER BORDER.

One thing you alluded to, Mr. Buchanan, is the fact that in southern New Mexico and Arizona—I am not sure whether the same thing happened in southern Texas or not—wolves are constantly coming across from old Mexico. The stockmen along the border report to our inspector the arrival of wolves. During the past season in Arizona over 30 wolves came across, and were reported on the stock ranges bordering Mexico. Our men killed all these except one which got away and returned to Mexico. Not one of them got more than 25 miles north of the border. That I consider was a pretty effective record. They actually got the skins of these animals. They came in packs, one pack consisting of seven, and they cleaned them up very promptly.

You see these animals make kills and leave tracks, and the stockmen find them right away after they come over. There is a very big reservoir of wolves in the Sierra Madre Mountains of old Mexico, and if they were not stopped they would keep Arizona and all that southwestern country full of wolves. We are holding them down by killing them promptly after they come across the border, before they have time to become established and breed.

In addition to the saving of live stock, the predatory animals are also extremely destructive to game of all kinds and, naturally, the killing of such a large number of them saves a very great amount of game and has a great influence in increasing the supply.

In Michigan, the conservation commission asked us for assistance in organizing a predatory animal service under the State game commission, to help suppress the wolves which were destroying deer on such a large scale in the northern part of the State. We have had a man there, and the officials appear to be very appreciative of the work he is doing in teaching the State wardens, who are

special men appointed to work with him. They learn how to handle the work of killing the wolves, by trapping and poisoning. With this instruction and direction of its men the State is enabled to handle its problem.

DESTRUCTION OF RODENTS.

The destruction of rodents is a part of this work. The losses from rodents of different kinds amount to about \$500,000,000 a year, according to the estimates that have been made after careful investigations, and there are many sorts of rodent pests in every State in the country.

In the West, where the dry climate is especially suitable, the injurious rodents are much more abundant than anywhere else—prairie dogs, jack rabbits, gophers and quite a variety of others, and various kinds of ground squirrels. The organized campaigns, with the special methods of poisoning that we have developed, have convinced the people of the effectiveness of the work to such an extent that during the last year about 105,000 farmers and stockmen cooperated, and \$799,974 was expended as cooperative funds in these campaigns. They put up for this rodent work about five times as much as the Government.

Mr. ANDERSON. It must be more than that, if it is \$700,000?

Doctor NELSON. Yes, it is \$799,974.

Mr. ANDERSON. According to your figures here, you are spending about \$128,000 on that.

Doctor NELSON. On the rodent work?

Mr. ANDERSON. Yes.

Doctor NELSON. Yes; the cooperative funds amount to about six times as much. Some of the States are making direct appropriations which have to be spent in cooperation with the Biological Survey.

We used 1,000 tons of poisoned grain, and 757,000 pounds of bisulphide of carbon, a fumigant which is put in the burrows. That was used by the cooperators and the survey combined.

During the course of the work we have poisoned over 10,000,000 acres of Federal lands, and under personal direction or in cooperation over 93,000,000 acres of private land.

Mr. ANDERSON. That is altogether, during this period of operation?

Doctor NELSON. During the time since we began in 1916, over 103,000,000 acres, in which the majority of these animals have been destroyed; they have been either ground squirrels, pocket gophers, or prairie dogs.

JACK RABBITS AND PRAIRIE DOGS VERY DESTRUCTIVE.

Mr. BUCHANAN. What is your objection to jack rabbits?

Doctor NELSON. They are terrifically destructive, where they increase as they do, and in one instance we killed over 1,000,000 jack rabbits in eastern Oregon by poisoning.

Mr. BUCHANAN. Destructive of grain, you mean?

Doctor NELSON. They concentrate on the grain. When the grass dries up in the summer and the grain is growing in the arid West, that will be the one green spot in the whole region, and they concentrate for miles around, and in many places they have actually destroyed in a single night a man's crop. Where a man has had something like

30 or 40 or 50 acres they have just simply cleaned it up in one night. The jack rabbits in northern Nevada and also in Escalante Valley, in Utah, have actually caused the settlers to abandon their ranches; they could not raise crops.

Mr. BUCHANAN. There has been many a one there.

Doctor NELSON. After the poisoning campaign in northern Nevada, the people have gone back and there is a prosperous community there now. We have poisoned the rabbits and shown them how, and they are able now to go ahead.

In the case of prairie dogs, they concentrate about the farms and are exceedingly destructive, and they also occupy an immense area. Over 100,000,000 acres are occupied by prairie dogs in 12 western States, and they probably destroy 25 per cent of the forage in the country they occupy. In some places they take it practically all. They concentrate about the cultivated areas to such an extent that they often destroy the fields, and occasionally they clean up so that the man abandons the cultivated lands. In other places they take anywhere from 5 to 50 per cent of the crop, and in many places, before we poisoned them, they were unable to grow crops at all.

It will interest you, no doubt, to know that we have made a final clean-up of the prairie dogs in one area in southern Arizona, about 110 miles long and 15 to 20 broad. It was a very rich valley bottom, in which the prairie dogs were enormously abundant, and it was like a desert. They had destroyed everything and kept the vegetation right down to the bare ground.

Mr. BUCHANAN. I know all about those creatures. They are fit for nothing on earth except to ruin the country they make a town in. They have a regular city of prairie dogs.

EXTRACTS FROM LETTERS OF PERSONS BENEFITED BY THE CAMPAIGN AGAINST
PREDATORY ANIMALS.

Doctor NELSON. Mr. Hugh Campbell, president of the Arizona Wool Growers' Association, wrote a letter August 3. He says:

On June 23, 1922, the last prairie dog was exterminated from the counties of Cochise and Graham. This was a result of three years' united effort on the part of over 800 stockmen and farmers cooperating with two experts of the Biological Survey. An area 120 miles long and from 10 to 20 miles wide was actually cleared of this pest.

Three years ago when I visited this district I rode through miles and miles of prairie dog infestation, and bare, denuded lands lay on every side. To-day, after these pests have been exterminated, the grass is knee high. Fat stock and fertile farms are to be seen on every hand and a prosperous community is in the making, where heretofore at least 5,000,000 prairie dogs had their way and forever held in check the development of that fertile valley.

It is estimated that the increased forage now made possible will support at least 50,000 head of sheep, and farmers are now growing alfalfa and grain on ground which was formerly so heavily infested with prairie dogs that it was quite impossible to raise anything.

I think there is a good example of direct benefit derived from that work.

We have also cleaned up four counties in Kansas. We organized there, or suggested to the State agricultural college, which is cooperating with us, that they begin on the eastern border of the prairie-dog infested area in Kansas and clean one county after the other, moving west each time, in order that they may make a final clean up. They have been fighting prairie dogs in Kansas ever since the farmers of the State went in there, and they still have them. By

this method of starting in definitely on the eastern border and just going west they will finally eliminate them from the State. When they get a county cleaned it is cleaned; there is no way of reinfesting, except from the west, and they will keep pushing that line to the west. As I say, during the last year they cleaned up the prairie dogs in four of the Kansas counties.

In northwestern Arizona for some years now—the last 10 years or more—the prairie dogs have been extending their range several miles a year into new territory, going west. We have cleaned up a belt along that western extension border of over 50 miles long and about 5 miles deep, and are going to stop that western extension. At the same time we are carrying on the general work of destroying the animals elsewhere.

Mr. Charles Springer, who was chairman of the Council of National Defense in New Mexico during the war, and who is one of the largest stock and land owners in the State, became very much interested in our work at the time of the war. In the food-saving campaign he backed the intensive work we were doing in helping to destroy prairie dogs in crop areas. I asked him in a letter if he had ever made any estimate of the effect of prairie dogs on the grazing industry in New Mexico, and he wrote that he had; that when he became chairman of the Council of National Defense for New Mexico he had taken it up with his county chairmen, and they had made a survey of the State. He states here that—

In the 50,000-acre unit now being investigated and treated—

That is where our men worked—

in the Moreno Valley in Colfax County, the prairie dogs destroyed nearly all of the grama grass and I believe the damage to that range amounted to 75 per cent. Generally the damage done by prairie dogs in the infested areas with which I am familiar ranges from 40 to 50 per cent to 100 per cent. I have seen in Rio Arriba and Sandoval Counties, and in some of the other counties, large areas rendered practically worthless for grazing purposes by these pests. It is safe to estimate that the annual damage made to ranges in New Mexico has amounted to destroying the grass on more than 6,000,000 acres of the very choice grazing land of the State, the areas selected and infested by prairie dogs being generally the best grama grass flats and draws. Opinions differ as to the number of acres of grazing land required to support one head of cattle.

In Colfax County on the grama grass ranges, where there is much rough, unproductive land, we generally estimate that it requires 20 acres, one year with another, for each cow or grown bovine animal; and as the lands infested by prairie dogs are very much better than the average, I believe it is safe to estimate that the 6,000,000 acres rendered worthless by them would support 400,000 head of cattle or more than 1,500,000 head of sheep.

That indicates his opinion as to the damage. Considering the fact that New Mexico is one out of 12 or 13 States that have prairie dogs, if you get rid of the prairie dogs in all of the States we figure that you could add more than 1,000,000 head of cattle to the range in the West from the increased forage alone.

In this connection, I have here a photograph of wheat from a square yard of land from which the prairie dogs have been poisoned [exhibiting photograph to the subcommittee], and here [indicating] where the prairie dogs are operating, which is also a square yard of production. The prairie dogs cleaned it up and left the stubble [exhibiting another photograph to the committee].

Here in northern Arizona we fenced a small area with prairie dog-proof fence. Then we put stock-proof fence on another area right adjoining, keeping the stock off, but leaving free access to the prairie

dogs. In the area in which the prairie dogs were fenced out there was the growth of the forage [indicating on photograph], and here on the outside, where the prairie dogs, but no cattle, were permitted, that was the growth [indicating]. That is a practical illustration of what these animals do.

Mr. BUCHANAN. There is absolutely no question but that prairie dogs, when they have a settlement or town—they call them prairie-dog towns—are absolutely destructive of agricultural vegetation, and they render the land practically useless. I have seen vast territory just abandoned on account of prairie dogs. There is no question about that.

Doctor NELSON. The object of this rodent work is to control, and eventually eliminate, those pests, and it is a long job, because they cover such a tremendous area. It is a job that simply has to be continued, and while it looks like a long job there is one encouraging feature, however. You have things like insect pests which are so numerous and which are spread over such an area that their extermination becomes a practical impossibility. All that can be done is to try to hold them down in their destructiveness. The prairie dog can actually be eliminated and done with forever. The only thing is, it requires a long, continued, patient, organized campaign.

CAMPAIGN FOR CONTROL OF HOUSE RATS.

House rats: We are also having a large campaign for the control of house rats all over the country, and there is a very great interest in that work. At the present time there is a campaign going on in Portland, Oreg., under one of our men, which is getting very good results. They not only destroy the rats but they establish methods of rat-proofing and start rat-proofing campaigns and cleaning up of trash piles and eliminating the places where these pests live. In that way they inaugurate a permanent riddance.

In Texas in one county last year—Denton—there was a campaign against the rats led by one of our men, and by actual count 253,000 rats were killed. There is a population there of about 36,000 people, and evidently the rat population was very much more numerous than that of the people.

The rats are exceedingly destructive of crops and food of various descriptions as well as goods of every kind, and also carry diseases, and are a menace from that point of view.

I might state, in connection with the rat work, that during the last year we had 325 requests for information and assistance from 42 States in regard to rat work and 76 requests to help in campaigns in 26 different States for the suppression of the rat nuisance.

FUR-FARMING INVESTIGATIONS.

We are also carrying on investigations into fur farming, and have an experimental fur farm in New York State. The fur-farming business has increased and become very profitable, and there are now over 500 silver fox farms in the United States, with about 12,000 foxes, and an investment of about \$8,000,000. There are fur farms in 25 States; there are also about 200 or more fur farms in Alaska.

We have experts at work investigating various phases and furnishing the information which is needed to help the people handle this business in the most effective way. It is an entirely new type of business and the people going into it naturally have no accumulated knowledge to fall back on, and we are trying to assist them. Judging from the appreciation that they are showing, we are proving very helpful in building up the business along the best lines.

Mr. ANDERSON. Are you getting any action out of this knowledge obtained at the experimental farm?

Doctor NELSON. Yes; we are getting a great lot of information on the handling of the parasites and diseases and methods of taking care of them, and one of the interesting things we have discovered there is the breeding season of the marten, the American sable. Heretofore, for years they have been trying to breed martens without success. They had the idea that martens bred in January and if put together at any time except the breeding season, one of the pair would kill the other, and so they held them apart. So they would keep them apart all the year until January and then put them together. They got no results.

Our man tried putting them together in the summer, and they mated, and two different years we have got young. They appear to mate in August and carry their young for about eight months, that is, so far as the present indications go. A neighboring fur farmer in New York tried the same experiment and got the same results.

We thus appear to have solved what was thought to be an impossible matter; that is, the successful breeding of the marten in captivity. We have had three successful breeding seasons, and there seems to be no doubt but that they can be successfully bred in captivity. So the marten is one of our valuable fur animals. This is quite an important piece of information.

INVESTIGATIONS OF FOOD HABITS OF BIRDS.

Another item under this same appropriation is the investigation of the food habits of birds, and the experiments and study to control losses to agriculture by bird pests, such as blackbirds, crows, and others. In some places they become tremendously destructive. The work that the Biological Survey has been carrying on ever since its origin, of studying the contents of birds' stomachs in order to determine exactly what the birds eat at different times of the year, has formed a basis for a large part of the protective legislation for useful birds throughout the United States. All the States base their appreciation of the value of birds on these researches, which are still going on.

There is a curious thing, and yet a thing not unexpected, and that is that birds with the changing conditions and changes in agriculture, change their habits frequently, and birds that are usually harmless may become quite harmful at certain seasons, particularly in connection with the destruction of fruit.

There are other protected birds, such as herons, that destroy fish on a large scale.

Under the law, as regards migratory birds, the Secretary of Agriculture has the authority to issue permits to destroy protected birds where they are destructive to agriculture or other interests. We

investigate complaints, and where warranted, the Secretary issues the necessary permit for the destruction of these pests.

Some of the questions are exceedingly difficult to settle, like that of the destruction of grain in the Imperial Valley in southeastern California, where the blackbirds assemble by hundreds of thousands, and eat the milo maize and other crops of that character. I saw one field of 160 acres that they had actually cleaned up so the owner did not cut the crop.

Mr. BUCHANAN. How do you destroy those birds?

Doctor NELSON. We have not been able to find how to do it successfully.

Mr. BUCHANAN. I expect I have seen a million in one drove; the whole country black with them.

Doctor NELSON. Occasionally we can poison these birds on a considerable scale, as our man did in studying them there. He poisoned several thousand in one case. But it is just good luck, because the flocks are irregular in their movements, and there is no telling where they are going to come next; it is a sheer accident if they come to a poisoned field.

Mr. BUCHANAN. Do you ever poison any ducks?

Doctor NELSON. We poison the grain.

Mr. BUCHANAN. I know, but did you ever put out poison for ducks?

Doctor NELSON. Oh, no.

Mr. BUCHANAN. They do in some places, do they not?

Doctor NELSON. I never heard of it. Wild ducks?

Mr. BUCHANAN. Yes.

Doctor NELSON. I never heard of it.

Mr. BUCHANAN. Ducks do go into the fields and tear the shocks down.

Doctor NELSON. I never heard of poisoning them.

Mr. BUCHANAN. I heard they did in Canada.

FOR BIOLOGICAL INVESTIGATIONS.

Doctor NELSON. The next item is for biological investigations, which cover the technical, scientific investigational work of the bureau, forming the fundamental basis for our economic work. It is necessary to study the various animals from a technical point of view in order to determine what they are, the different species of birds and the different species of mammals and their distribution and characteristics.

In connection with that, one of the forms of activities we are pushing is the banding of migratory birds to study their flight—their lines of travel. A great many people are doing this work voluntarily. I think there are over 400 in different parts of the United States who are doing this voluntary work. We supply the bands and the blanks for records, and they do the work. They trap the birds in wire traps or nets, and put an aluminum band on one leg of each bird. This band has an inscription on it to return to the Biological Survey, Washington, and when anyone gets one of these birds, the band is removed and mailed in.

Mr. ANDERSON. The band having a serial number, or something of that sort?

Doctor NELSON. Yes, sir; they have a serial number. It is proving most interesting. We are getting very extraordinarily interesting results, which will increase, of course, year by year, because of the accumulation of the birds banded.

We get quite as unexpected information as we did in regard to the ducks banded near Salt Lake, in Utah. Afterwards one of those ducks was taken in central California, another one was taken over in Kansas, another one in Arizona, and another one in Alberta—at every point of the compass from that center. The ducks went east and west across the mountain, which was quite surprising. That was something we had not suspected, and is very significant, because it means that these great marsh centers, such as the Bear River marsh, at Salt Lake, form reservoirs from which ducks start and supply the surrounding States in every direction. Before that we had always supposed ducks flew north and south; we did not suppose they were flying at right angles to that course.

Among the scientific researches are investigations in response to inquiries from different governmental departments and from the States, and we have the cooperation of a large number of people in connection with that work.

INVESTIGATIONS RELATING TO FORAGE OF LARGE GAME ON NATIONAL FORESTS.

We are also investigating the relations of large game to forage on the national forests in order to work out a system whereby a certain amount of large game can be maintained without seriously interfering with the grazing industry. At its last meeting the National Live Stock Growers' Association passed a resolution asking that the Biological Survey and State officials handling matters of that kind institute an investigation in order to determine what can be done in the matter of maintaining game in connection with the grazing industry. We are carrying out that work as rapidly as we can.

We have recently investigated the situation on the Kaibab Plateau, in northern Arizona, which is a Federal game preserve and national forest, where the deer have increased tremendously. There are now not less than 20,000 deer there, and our men have made the recommendation that about 2,000 bucks be killed next fall, if possible, in order to relieve the pressure. The deer are increasing to a point where before long they will eat themselves out of forage. They will not only eliminate the live stock, but will eliminate themselves, and some practical outlet must be found to take care of the surplus.

Mr. ANDERSON. We will now take up the next item, on page 240.

FOR ENFORCEMENT OF THE MIGRATORY BIRD TREATY ACT.

Doctor NELSON. The migratory bird treaty act, to enforce the protection of migratory birds. We have 28 fully paid, full-time wardens and several hundred wardens on a nominal salary who can be used whenever called on. They received no pay except \$1 a year unless actually employed in the service, in which case they receive \$3.50 a day and their expenses. These men are mainly deputy State game wardens. We have the cordial cooperation of practically all the State game services in the country, and in that way are able to accomplish much more than would be otherwise possible.

MIGRATORY WILD FOWL INCREASING RAPIDLY.

Under the administration of the migratory bird treaty act, the number of migratory wild fowl—ducks and geese—have increased very greatly. We have letters from all parts of the United States, and it is published in the sporting magazines repeatedly, that the result of the migratory bird treaty act has been a very great increase of wild fowl. The number of birds observed each year is much greater than it was before that act was passed, and that increase has been due to the fact, largely, that we stopped the shooting of birds in the spring and stopped the sale of game.

The destruction of game by wholesale scale was ended, and breeding supply of birds which had survived the fall hunting and the winter were enabled to get back to their breeding grounds.

The need of protection of this kind is shown by the fact that the birds were decreasing very rapidly at the time this treaty was negotiated and the law passed. The sportsmen of the country realized that unless something of this kind was done the migratory wild fowl would be exterminated in a comparatively few years.

Last year there were more than 4,000,000 hunting licenses issued by the different States. Adding to that number those who hunted in States where a license is not required—and those who are exempt from taking out licenses through ownership of land or other causes—it is estimated that a total of over 6,000,000 people hunt each year in the United States. It is obvious—

Mr. ANDERSON. The woods are full of them.

Doctor NELSON (continuing). That the game has to be protected, because in some places it is fairly mobbed. It is generally conceded among sportsmen and those acquainted with the subject that this migratory bird treaty act has been one of the most successful conservation laws ever passed by Congress. It has demonstrated its effectiveness in the recognized increase of birds.

IMPORTATION OF FOREIGN BIRDS AND MAMMALS.

In connection with this work, we also supervise the importation of foreign birds and mammals for the purpose of keeping out destructive species, and we are successful in that. The mongoose is the most dangerous of all animals if it should get a footing in the United States. It is a little animal from India, weasel-like in its habits and terrifically destructive. They were imported into Jamaica and into the Hawaiian Islands, and wherever found they wreak havoc with all ground-frequenting birds. Many of our ground-frequenting birds are game birds, and they would be wiped out if the mongoose became established in this country. They would do well in the southern United States and they would wipe out all quail, grouse, and wild fowl that nest in the ground.

Mr. ANDERSON. How do they get imported into the country?

Doctor NELSON. People bring them in. They know that they are great rat killers, and so people, ignorant of their habits and what they have done in the countries where they have been introduced, think it would be a fine thing to have them kill rats.

There is a real danger that these animals might be introduced in some areas and spread all over the tropical and other warm parts of

the American continent. We are constantly guarding against their importation. They are coming in every little while, and when they come in we switch them off and either have them killed or sent back to where they came from.

INVESTIGATION OF REINDEER INDUSTRY IN ALASKA.

The CHAIRMAN. We will now consider the next item, page 442.

Doctor NELSON. Those are investigation experiments in connection with reindeer and the protection of the land fur-bearing animals in Alaska.

The reindeer in Alaska were first introduced in 1892, and up to 1902 they imported a total of 1,280 animals. There are now 200,000, perhaps, reindeer in Alaska, in addition to 100,000 or so that have been killed—the offspring of that one thousand two hundred and odd. This indicates that conditions in Alaska are extremely favorable to reindeer growing. They were imported for the benefit of the Eskimos, but gradually they have, of late years particularly, drifted to some extent into the hands of white men. So that at the present time two-thirds of the holdings in Alaska belong to the natives and about one-third belong to the white men who are beginning to develop the business on a commercial scale and to export the carcasses.

Up to 1920 nothing had been done in the way of scientific study of the reindeer business in Alaska or of conditions on the range—what the range would support and how it should be handled. In 1920 Congress gave an appropriation to the Biological Survey to begin investigations of that character, and I went up to Alaska with some experts and established them at an experimental station on the coast, where they are now conducting investigations. The preliminary results have been published in a bulletin published recently, which is the first bulletin of the kind. It contains a comprehensive survey of the reindeer business and points out what is needed to conduct it successfully. The conditions under which the reindeer business was conducted in Alaska were very crude, but they have already begun to take advantage of some of our suggestions and report surprisingly good results as the outcome.

We have found that there are at least 120,000,000 acres of land in Alaska that are suitable for reindeer grazing. This area would accommodate in the neighborhood of 4,000,000 reindeer. These animals breed very rapidly. They begin having young when they are only a year old, and at 2 years nearly always have young, and they raise a large per cent of calves.

The meat is of excellent quality, but the animals are small. The carcasses of the animals that have been shipped average about 150 pounds each. In Alaska there is a large wild caribou, which is another name for the wild reindeer, individuals of which are said frequently to dress by actual weight from 300 to 400 pounds, in contrast with 150 pounds in the case of these imported reindeer.

We completed in August a trap corral in McKinley Park, Alaska, where we propose to capture some of these big young bulls and put them with the reindeer herds for the purpose of grading them up.

This wild blood will give stamina to them and at the same time will grade them up in size.

Occasionally in Alaska these outside caribou bulls have gone with the herds and the offspring are big animals. It is said that by looking at a reindeer herd you can tell the half breeds by their standing up above the others. There is no question that by proper selection the reindeer probably can be brought to double their meat output per annum. That is one of the experiments we are conducting.

We have a small power schooner with headquarters at Nome that our men use to visit the reindeer herds along the coast of the Arctic and southward. They are also making a definite, careful study of the forage plants used by the reindeer and the distribution of these plants. At the same time they are studying the characteristics of the country, in order to work out a method of allotment of grazing land, for the purpose of allotting these reindeer herds definite areas just as is done on the national forests. They already have that worked out over a considerable area, and as soon as Congress passes the necessary legislation allotments can be made. That will be a very great help to the business, because at present they are almost walking on each other's feet, and herds are interfering in a very detrimental way. There is a lot of mixing up of reindeer belonging to different owners and this results in heavy losses.

In addition we have the supervision of land fur-bearing animals in Alaska and are maintaining warden service. We have a patrol boat in southeastern Alaska and are trying to prevent the overkilling of fur-bearing animals.

The fur-bearing animals from Alaska afford a return of more than \$1,000,000 a year, and it is of great importance that the killing by poison and killing out of season of these animals be restricted in order that the output can be maintained.

Mr. BUCHANAN. Ought not killing by poisoning be prohibited?

Doctor NELSON. It is prohibited.

Mr. BUCHANAN. You used the word "restricted" unintentionally, I suspect.

Doctor NELSON. About poisoning?

Mr. BUCHANAN. Yes.

Doctor NELSON. We restrict the killing, but stop the poisoning wherever we can. No poisoning is permitted.

Mr. BUCHANAN. I did not want the record to go down that way.

Doctor NELSON. Is there anything further in regard to this item?

FOR ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. I think not. Now take up item at page 244.

Doctor NELSON. There is no increase here. It is just the conduct of the routine business of the office. Unless you have some inquiry there, I do not know that there is anything to be said about that.

WEDNESDAY, NOVEMBER 22, 1922.

DIVISION OF ACCOUNTS AND DISBURSEMENTS.

STATEMENT OF MR. A. ZAPPONE, CHIEF OF DIVISION AND DISBURSING CLERK.

Mr. ANDERSON. You have an item for salaries for which you are asking \$59,420, and you have some increases in this roll.

Mr. ZAPPONE. Mr. Chairman, before taking that up, I have a brief statement here in regard to the work of the division which I would like to put into the record.

Mr. ANDERSON. You may read it.

GENERAL STATEMENT OF WORK.

Mr. ZAPPONE. The Division of Accounts and Disbursements, in accordance with law and regulation, pays accounts submitted by the various bureaus, divisions, and services of the department. Accounts are examined to ascertain that approvals are genuine, that extensions and additions are correct, and that there are appropriations out of which they are legally payable.

A cashbook record is maintained of all individual payments, and ledger records are kept of disbursing and appropriation debits and credits of all funds of the department. Through the use of a card index duplicate payments are prevented and a ready reference to payments is available. The division also supervises the placing of funds to the official credit of temporary special disbursing agents and other fiscal officers of the department, and after making a record thereof transmits their accounts to the General Accounting Office. It receives and accounts for all moneys due the department from various sources; makes advances of public funds to employees for the payment of their expenses while traveling on official business; maintains a record of liabilities and disbursements in connection with purchases of lands under the Weeks forestry law; keeps the departmental record of amounts withheld from employees' salaries under the provisions of the retirement act of May 22, 1920, and, under the direction of the Budget officer, assists in compiling the annual estimates of appropriations. Miscellaneous financial reports are prepared from time to time as required. During the fiscal year 1922 this office also received and deposited in the Treasury all the collections of farmers' seed grain loans, and maintained the file of notes and mortgages and a detailed record of the repayments thereunder.

SALARIES.

There is an increase in the estimates of \$3,600 to provide for three additional employees at \$1,200 each. The salary roll has increased only \$9,650 during the nine-year period from 1915 to 1923, inclusive, with an increase in the number of employees from 32 to 38, most of which increase was allowed by this committee during the last two years. During the same period the appropriations of the department carried by the agricultural act have increased from \$20,000,000 to approximately \$36,000,000. In addition there have been large ap-

appropriations carried in special acts that have been passed by Congress from time to time, such as the permanent appropriation for meat inspection, for the acquisition of lands under the Weeks forestry law, the seed grain loans act, and the acts for Federal aid to the States in the construction of roads, amounting annually to millions of dollars.

Mr. ANDERSON. Are those cleared through your office?

Mr. ZAPPONE. A record of them is kept in my office and all of the accounts are paid there.

Mr. ANDERSON. For Federal aid for roads?

Mr. ZAPPONE. Yes, sir. For Federal aid to roads. The States make the payments in the first place and then the accounts are submitted and refunds made by the Government for 50 per cent of the work done. That work is centralized by the Bureau of Public Roads in Washington, and the accounts are scheduled to me for payment like other accounts of the department.

Mr. ANDERSON. Is that true in the case of the aid given through the Smith-Lever Act?

Mr. ZAPPONE. That is not true in the case of the Smith-Lever aid. Those appropriations are advanced directly to the States by the Secretary of the Treasury and payments are made by the States. However, the requisitions for funds pass through the Secretary of Agriculture to the Treasury Department as required by the law.

Mr. ANDERSON. The bookkeeping that is done in connection with those funds is not handled in your office?

Mr. ZAPPONE. No, sir; except to set up the amounts in my ledger; all the work is conducted by the States Relations Service. They have a detailed record and must have in order to keep in touch with what the States are doing, and to enable them to prepare the annual report which they have to submit to Congress in regard to the funds.

NEW ACTIVITIES REQUIRING ADDITIONAL HELP.

The additional appropriations mentioned have added largely to the work of the office. The accounts and checks have increased during the past year about 10 per cent. The number of employees in the department during the past year has also increased about 1,000, from about 19,000 on October 31 last year to about 20,000 on October 31 this year.

Mr. ANDERSON. Where does that increase come in; under the grain futures act?

Mr. ZAPPONE. A large part of it was in the Bureau of Agricultural Economics, due to the grain futures act and other new activities, also to additional legislation Congress has passed, such as the packers and stockyards act, operation of the Center Market, and the seed grain loans act. Then the fixed nitrogen laboratory was transferred to the Department of Agriculture from the War Department.

REVENUES OF THE DEPARTMENT.

The revenues of the department are also increasing annually. During the fiscal year 1922 the revenues for miscellaneous receipts alone amounted to about \$5,000,000, and repayments to the appropriations about \$3,000,000, making about \$8,000,000 in all.

Mr. ANDERSON. I wish you would give us a statement of the receipts and the sources from which they come.

Mr. ZAPPONE. Such a statement has been inserted under the office of the Secretary.

CLASSIFICATION OF ALL EXPENDITURES.

Mr. ANDERSON. Anything further?

Mr. ZAPPONE. During the present fiscal year a new activity has been added to the work of my office; that is, the classification of expenditures in accordance with certain objects of expenditures prescribed by the Comptroller General in Bulletin No. 1 issued by his office on May 11, 1922.

The Secretary felt that he would like to have a centralized record in the department of the objects of expenditures as prescribed, and to do this I put in four punch machines, a tabulating machine, and a distributing machine similar to those used in the Census Office for compiling the census. The vouchers are coded by the bureaus and are sent to my office for payment. After payment, they go to these machines, and the various objects of expenditure are recorded.

In two or three years from now, I hope to be able to make statements of expenditures under any class or object of expenditure, as prescribed in the bulletin, for the entire department. That is the advantage of a centralized record.

The bureaus are keeping a similar record, but they only show the bureau end of it. That is all that they will have. For instance, if you want to know the amount of the expenditures for fuel for the entire department, or for ice, or for stationery, or any of the fixed charges, it can only be obtained by calling on the various bureaus for it. But sometimes this information is required quickly, and, by means of these machines, it can be turned out in a few hours. You simply run the cards through them and there are no mistakes. They are practically infallible. The cards are run through twice, and the results balance. If they do not, there is something wrong. I think that is all.

STATUS OF WORK.

Mr. BUCHANAN. What is the condition of your work now; is it current?

Mr. ZAPPONE. It is not current. My work is slightly in arrears just now. It is due to the stress of work at this time and more particularly to the large number of financial statements and other data that we have had to prepare, most of which has been for the information of the Budget Bureau. In conducting its work the Budget Bureau necessarily requires considerable data and this has imposed additional work on my office and other offices of the department.

Mr. BUCHANAN. The reason that it is not current now is not due to a lack of two or three employees, is it?

Mr. ZAPPONE. No; I asked for more but that is all that was allowed; however, I hope to get up the work with the three employees requested and such additional help as I may be able to get from the bureaus in the way of temporary details.

Mr. BUCHANAN. So you asked for more employees than are in the estimate and the Bureau of the Budget cut them off?

Mr. ZAPPONE. Well, they were not allowed.

Mr. JUMP. The truth of the matter is that with reference to the Division of Accounts, I have never seen a year since I have been in

the department that there has been so much extra work of this type. We are finding it necessary constantly to call upon this division to compile statements of various kinds, nearly all of them complicated in character and some of them tremendous in volume, and I do not see how his office has done the work with the force that it has. As a rule the Division of Accounts has to bear the brunt of getting up that type of work.

Mr. ANDERSON. We will take up the question of the library.

INTERCHANGE OF APPROPRIATIONS.

Mr. JUMP. Mr. Chairman, before proceeding to the library do you wish to ask any questions as to item on page 310 "Interchange of appropriations"? That is the 10 per cent transfer provision relating to the general expense items.

It is merely a repetition of the language carried in this year's bill.

Mr. BUCHANAN. You had that up last year?

Mr. JUMP. It is the same thing. The same language is submitted.

Mr. ANDERSON. I think that there is no necessity of going into that. My recollection is that the chairman held it in order last year, so that I think there will be no question about it.

REPORT ON PER DIEM RATES ON TRAVEL.

Mr. JUMP. The report on per diem rates, etc., on travel—do you wish to ask any questions on that?

Mr. ANDERSON. No.

Mr. JUMP. That is all, then, before we come to the library item.

WEDNESDAY, NOVEMBER 22, 1922.

LIBRARY.

STATEMENT OF MISS CLARIBEL R. BARNETT, LIBRARIAN, DEPARTMENT OF AGRICULTURE.

SALARIES.

Mr. ANDERSON. The first is the item of salaries. Your statutory roll this year calls for the same amount as last year?

Miss BARNETT. Yes, sir.

Mr. ANDERSON. The next item is:

General expenses, library: For books of reference, law books, technical and scientific books, newspapers and periodicals, and for expenses incurred in completing imperfect series.

And so forth. You have this year \$25,000, and you are asking for \$30,000 for 1924, which is an increase of \$5,000. Will you tell us about that increase, please?

GENERAL STATEMENT OF WORK.

Miss BARNETT. The reasons are quite fully given in the explanatory notes accompanying the estimates, but I have prepared an additional statement which I should like to give, if you have time for it.

Mr. ANDERSON. We will be very glad to have it.

Miss BARNETT. The library of the Department of Agriculture is a scientific and technical library. It comprises approximately 165,000 volumes and receives currently 3,000 periodicals. The subjects which it covers are the subjects under investigation by the department. The question is sometimes asked, Why is it necessary for the Department of Agriculture to have a library? Why can it not get all the books it needs from the Library of Congress? With all its great resources it is impossible for the Library of Congress to care for all the special needs of the various departments. Its resources must be supplemented by the libraries close to the work of the departments and bureaus. A very large part of the books contained in the library of the Department of Agriculture are not available in the Library of Congress nor in any other library in the country. This is especially true of foreign agricultural books, for the Library of Congress does not attempt to cover in any adequate way the fields in which the department is especially interested, namely, agriculture and the related sciences. But even books on these subjects, if contained in the Library of Congress, are not duplicated in the library of the department unless they are frequently needed or are of special interest. It must be borne in mind, moreover, that the Library of Congress serves a very large clientele and that it would be decidedly unwise to delay the work of the department because of the inability to obtain promptly the use of books which are essential in its investigations. However, the resources of the Library of Congress and of other Government libraries are always taken into account, and it is the policy of the library of the department to avoid unnecessary duplication.

All the civilized countries of the world have made great progress in agricultural research and instruction during recent years. It becomes more and more important for the investigators of the Federal Department of Agriculture and State institutions to keep track of this progress. This necessitates a constantly increasing expenditure for books and periodicals in which the results of such work are given.

NEED OF ADEQUATE LIBRARY FACILITIES.

The importance of adequate library facilities to a research institution such as the Department of Agriculture can not be too strongly emphasized. If the library is weak or inefficient because of inadequate resources or by reason of an insufficient or poorly trained staff, the work of the department is bound to suffer. All effective research must be based on what has already been done in the same field, unless a great deal of wasted effort, loss of time, and duplication are to result. Testimony bearing upon the importance of adequate library facilities in research work is given in a paragraph of a recent report of the Department of Agriculture of the Union of South Africa deploring the lack of proper library facilities in that department. It says that "in many cases members of the staff of the department who have to investigate particular important problems find their work doubled by lack of data already published in connection with similar important problems in other countries. In many cases they have to spend six months of salaried time and considerable experimental funds on an investigation which could have been done in three months and at half the cost if a well-equipped library had been within reach.

To make the results of past investigations available it is necessary not only to have at hand books in which experiments have been recorded, but in addition the material in these books must be made available through catalogues and indexes. Few investigators have the time to keep records of the literature concerning their own specialties, much less on allied subjects which they must often consider in connection with their experiments. They are coming more and more to depend upon libraries not only for supplying them with books but also for organizing these collections and for systematizing and putting in permanent form in the shape of catalogues, bibliographies, etc., information concerning published research, so that it may be available when needed in connection with special investigations.

BIBLIOGRAPHICAL WORK.

Mr. ANDERSON. Let me ask you there, Miss Barnett, do you do any bibliographical work?

Miss BARNETT. Yes; we do. As an illustration of the kind of bibliographical service that the catalogues and indexes enable the library of the department to give may be cited the résumé of the results of price fixing through 46 centuries, prepared by the librarian of the Bureau of Agricultural Economics, which was especially useful in connection with the National Agricultural Conference last year. That is just one of a number of examples we could give.

Mr. ANDERSON. You get requests from people in the department to work out all material in the library, specifying material upon special questions, or relating to particular investigations?

Miss BARNETT. Yes; that is what we try to do. We maintain a catalogue of more than 1,000,000 cards, which of course, is the basis for all of our bibliographical work.

Mr. ANDERSON. I suppose that includes, of course, subject indexes and author indexes?

Miss BARNETT. Yes; both subject and author indexes.

The library is an essential and important part of the equipment of the department and as such can not be impaired without serious loss to the work of the department. It must keep pace with the growth of the department and keep in close touch with the growth of agricultural work all over the world if the investigations of the department and of the affiliated State institutions are to be carried on to the best advantage.

COST OF PERIODICALS.

Unfortunately the support given the library in the past few years has been most inadequate both for salaries and for books. In order to make this clear it is only necessary to review briefly the library's appropriations for the past seven years, from 1917 to date, a period in which the work of the department has greatly expanded. In 1918 the department appropriation was \$25,929,113. For 1923 it is \$36,774,173, an increase of 30 per cent. In 1917 the total appropriation for salaries and general expenses of the library was \$49,520. For the year 1923 it is \$57,600, an increase of only \$1,140 for salaries and \$7,000 for general expenses.

The total increase in the library appropriation during the seven years amounts, therefore, to only \$8,140, or approximately 17 per

cent. On the other hand, the cost of books, periodicals, supplies, and equipment during this period has increased from 30 to 200 per cent. To give only one or two examples, the Rand, McNally & Co. atlases have increased in price in the past seven years from \$16 to \$35 a copy, and the Official Railway Guide, for which some 30 subscriptions are needed in the various offices of the department, has increased from \$9 to \$18 each.

Mr. ANDERSON. Is that paid out of the library appropriation?

Miss BARNETT. That is paid out of the library appropriation.

Mr. ANDERSON. Why should it be paid out of that appropriation?

Miss BARNETT. Well, you see, under a law passed by Congress in 1898 it is illegal to use any part of any appropriation for the purpose of purchasing books and periodicals which does not specifically mention books and periodicals. The library appropriation, with one exception, is the only appropriation for the department which can be used for the purchase of books and periodicals.

For the reasons that have been explained, the increase of \$7,000 in the book fund in the past seven years is more apparent than real. It is in fact insufficient to cover the loss in the purchasing power of the dollar. Furthermore, due to the present system of business operation in the department the library is now called upon to pay from its appropriation for services which were formerly rendered the library by other offices of the department without charge. It must now pay for expressage, for its trucking service, for its multigraphing and mimeograph work and for its shopwork, all of which work was formerly paid for from other appropriations of the department. These expenses have still further decreased the amount available for books.

NEED FOR ADDITIONAL ASSISTANCE.

While the estimates for this year include no changes in the statutory salaries, it is necessary to say a word in regard to them, as they furnish additional reason for the increase in the book fund. In the appropriation for 1917 there were 33 positions on the library statutory roll. In the appropriation for 1923 there are only 28. Seven of these positions were cut off in the appropriation for 1922, and no provision for them was made by an increase in the fund for general expenses. In fact, this fund was decreased by \$600. In the appropriation for 1923 two additional places were restored to the statutory roll, making 28 in all, as compared with the 33 in 1917. As the work of the library has much increased in the past seven years, it was quite impossible for it to carry on the work required of it with a decreased force.

It was also impossible to provide for all the positions which were dropped from the statutory roll by carrying them on the fund for the general expenses of the library, without reducing the book fund to such an extent as to hamper seriously the work of the department. In the emergency it was necessary for the library to ask the help of the bureaus in carrying the salaries that were not provided for on the statutory roll. Their help has also been necessary this year. It will be seen, therefore, that the \$7,000 increase in the past seven years has been entirely inadequate to cover provision for the five positions dropped from the statutory roll, for the increase in the cost of books, periodicals and supplies, for additional shelving that is

needed this year, and for the increased demands made upon the library due to the growth in the work of the department.

For the reasons that have been stated a much larger purchase fund for the library is urgently needed if the department is to utilize in the most efficient manner the money appropriated for investigations and be in a position to cooperate effectively with the State institutions, which naturally look to the Department of Agriculture as headquarters for information on agriculture and the related arts and sciences.

FOR PURCHASE OF BOOKS AND PERIODICALS.

The \$5,000 increase in the estimates as approved by the Budget is \$10,000 less than the estimates presented by the department. On account of the great need for additional funds it is urgently recommended, with the approval of the office of the Secretary of Agriculture, that the following provision be inserted in the library appropriation:

Provided, That hereafter additional funds from any appropriation of the department for general expenses, may with the approval of the Secretary of Agriculture, be transferred to the appropriation for the general expenses of the library for the purchase of books and periodicals.

Such a provision would supplement the library appropriation and make it possible to meet the special, unforeseen and extraordinary needs of the bureaus for books and periodicals. In other words, when a new line of work is undertaken by the department the literature on which, as represented in the library is inadequate, it would be possible for the bureau to transfer to the library some of its funds for the purchase of additional books and periodicals needed in the work. For example, it would be possible to transfer funds for the purchase of extra copies of such reference books as atlases and dictionaries and the Official Railway Guide, needed for office use which do not however add to the permanent resources of the library.

This provision would be of great service to the department and is earnestly recommended in addition to the \$5,000 increase contained in the estimates. The bureaus have often expressed dissatisfaction over the fact that they can not buy books and periodicals from their appropriations, especially when they have greatly needed duplicate copies of reference books which the library with its limited appropriation was unable to buy for them. They have stated that they would be glad to use their funds for the purpose, but they have been unable to do so because of the law previously referred to which makes it illegal to purchase books and periodicals from any appropriation not specifically mentioning books and periodicals. The proviso recommended for inclusion in the library appropriation would make it possible to meet the needs of the bureaus and yet would not destroy the present unity of the library organization of the department.

BUREAU BRANCH LIBRARIES.

Mr. ANDERSON. Are libraries maintained by any bureaus of the department?

Miss BARNETT. The books are purchased by and recorded in the main library, but the different bureaus maintain what we call branch libraries. They pay for their assistants.

Mr. ANDERSON. Well, you have branch reference libraries in some bureaus?

Miss BARNETT. Yes.

Mr. ANDERSON. In all?

Miss BARNETT. Not in all of them.

Mr. ANDERSON. Not in all of them?

Miss BARNETT. In some of them.

Mr. ANDERSON. And where you have them, the cost of the library, if you have one, whatever it costs, other than the purchase of books, in connection with its maintenance, is borne by the bureau itself?

Miss BARNETT. Yes.

Mr. JUMP. But the books are all catalogued in the main library.

Mr. ANDERSON. I understand that. How is your appropriation for general expenses now divided between the purchase of books and the employment of personal service?

Miss BARNETT. At the present time?

Mr. ANDERSON. Yes.

DETAILS FROM OTHER BUREAUS.

Miss BARNETT. We estimate from this appropriation we will have to spend about \$3,000 for personal services, because the other bureaus now are carrying assistants for us that we can not carry.

Mr. BUCHANAN. \$3,000 for personal service?

Miss BARNETT. Yes; for personal services. We are keeping down just as low as possible the expenditures for personal services from the book fund.

Mr. ANDERSON. Now, with regard to this \$5,000 increase which is proposed in this item, do you expect to use it for additional service or for the purchase of books?

Miss BARNETT. I would like very much to have that reserved just for the purchase of books and periodicals, but unless we can get help again from the bureaus in carrying some of our present salaries it will be necessary for us to use some of it also for salaries.

Mr. ANDERSON. Are there any details now from the bureaus in the library?

Miss BARNETT. Yes.

Mr. ANDERSON. How many?

Miss BARNETT. At present we have seven, as follows: One from the Secretary's office, at \$2,000; one from the Division of Publications, at \$2,000; one from the Bureau of Public Roads, at \$1,600; one from the States Relations Service, at \$1,400; one from the Bureau of Biological Survey, at \$1,200; one from the Division of Publications, at \$960; and one from the Secretary's office, at \$900. The amount of the salaries carried last year by the bureaus for the library was approximately \$8,000.

Mr. ANDERSON. Is that in addition to the people they carry in their own libraries?

Miss BARNETT. Yes; but of the offices that are now carrying positions for the library only the Bureau of Public Roads and the States Relations Service maintain branch libraries.

Mr. JUMP. Do you not think that it would be a good policy, Mr. Chairman, to have an understanding that if the increase of \$5,000 is granted to the department, that it is to be used for books exclusively

and that next year in the estimates we will request provision for these salaries now carried by detail.

Mr. ANDERSON. I have always felt that this detail business was unsound. I think it is bad. Substantially, it amounts to using an appropriation for the purpose for which it was not intended. I recognize that very great necessities, perhaps, arise sometimes that make it necessary, but I think that it is bad practice, and so far as I am personally concerned, I would very much prefer to see this item carry whatever amount was necessary to take care of this business in the library and cut out these details, and to carry it as it is. I suppose that we will have to do it this way for the next year, but as soon as possible, I would like for you to get this on a basis which represents what it actually is. I think that that would be the best thing for everybody concerned.

Mr. JUMP. Of course the appropriation for such a small organization does not allow due flexibility as in the larger bureaus. If an emergency arises here, they do not have any large lump sum to turn to, and consequently details are necessary. Moreover, the library is a service unit for all of the other organizations of the department so that it does not seem improper to use the lump funds of the bureaus to this small extent for payment of a direct service to the same bureaus.

Mr. ANDERSON. I can appreciate that there might be occasions where details would be necessary, perhaps, under some circumstances; but where you have a permanent detail, as you apparently have here, carried on the rolls of other bureaus, I think it is bad practice.

Miss BARNETT. Unfortunately, they have not been permanent. Sometimes the details have only been for a period of three months.

Mr. ANDERSON. Well, it amounts to the same thing, except that the money is scattered around a little more, and just that much is used anyway.

Mr. JUMP. We have been able to do it like this, Mr. Chairman: In the division of publications, for instance, we had an editor who went on leave of absence for several months, due to illness. Now, we had a library employee we were able to carry on detail from publications by using the statutory place of that man while he was on leave without pay. Our being able to detail that position helped to just that extent in this particular branch. Of course, we have had a number of lines of work added without corresponding increases in the funds available for the library service. I refer to such additions as the packers and stock yards act, the grain futures act, and fixed nitrogen research laboratory, which, as its name implies, is particularly a research branch, and so on; and all of these things that have been added have increased the demand on the library, and it has been very helpful, really necessary, in fact, for us to have this much leeway.

However, next year we can come to the committee, if you desire, with a complete revision of that situation and provide for these employees.

Mr. ANDERSON. I would like to see what it would look like.

WEDNESDAY, NOVEMBER 22, 1922.

BUREAU OF PUBLIC ROADS.

STATEMENT OF MR. THOMAS H. MacDONALD, CHIEF OF BUREAU.

Mr. ANDERSON. We will now take up the Bureau of Public Roads statutory roll, on page 250.

Mr. MACDONALD. Before taking that up I have here a statement showing the general character of work of the bureau which I will insert in the record.

GENERAL STATEMENT OF WORK.

The operations of the Bureau of Public Roads are administered under two major divisions—first, the highway division and, second, the agricultural engineering division.

Under the first division the major activity is the administration of the Federal highway laws and the appropriations which have been made for carrying on cooperative road work with the several States. The construction of highways in the national forests in cooperation with the Forest Service is also handled under this division, as is the research work in highway engineering and highway economics, the distribution of war surplus, and the informational and educational activities incident to, and a necessary part of, the responsibility of leadership in the tremendous program of highway improvement which is going forward in the United States. This division is operated through six subdivisions, i. e., highway administration and engineering tests and research, war materials, highway transport and economics, informational and educational, and control. This last subdivision handles all of the accounting and fiscal records required in connection with the apportionments to the States and the disbursements to them for work which has been performed, and all other fiscal records of the bureau.

Under the second division, agricultural engineering, the major activities are those in connection with carrying on research in the fields of farm drainage, farm irrigation, and other engineering problems in connection with the utilization of land for agricultural purposes; studies of the proper design and research in the principles underlying suitable farm structures for efficient farm service, and the proper housing of farm animals; the distribution of the results of research and investigational studies upon these subjects through technical and farm bulletins, farm power studies involving both animal and mechanical power; the use of explosives for land clearing and utilization. This division is administered through three subdivisions—drainage, irrigation, and farm engineering. Practically all farm engineering problems and services for the Department of Agriculture are grouped under this division, and the opportunity is thus given to cooperate to a greater or less extent with many other bureaus and divisions of the department. There are many research problems engaging the attention of the department, which involve sometimes in a major and sometimes in a minor way, engineering principles, equipment, and design. The attention of the committee

is directed to the fact that the most notable advances which have been made in agriculture have been through the use of mechanical equipment and the substitution of power, either animal or mechanical, for man labor. The production of the individual has been increased, while his expenditure of muscular labor has been decreased.

The improvement of land through drainage in the humid regions, the reclamation of lands in the arid areas, the development of mechanical equipment for and application to farm conditions, have all been brought about through the application of engineering principles. There is a large field of problems having to do with the efficient and economical production of farm crops, their storage, distribution, and utilization, and the handling of the lands themselves in both the humid and arid regions which involve the principles which may be grouped generally under the designation "agricultural engineering." Within the past decade this group of problems has attracted the general recognition due the important bearing each has upon the general advancement of agriculture. The work of this division in the department has not been expanded in keeping with its importance. The appropriations are being maintained at a dead level, which will not allow its expansion, and because of the increased cost of carrying on work now as compared with the pre-war level it is impossible to produce results consistent with the needs of the times. Many highly important researches are being carried on without adequate personnel or facilities.

Among the outstanding results which have been or are being secured through the activities which the bureau is carrying on, either through cooperation with the individual States or independently, the actual completion of roads is perhaps the most important. During the past fiscal year more than 10,000 miles of highways of all types were brought to completion. This does not mean that all of the work on the 10,000 miles was done during the year, but that this mileage was brought to actual completion during the year.

The progress in highway research has been notable. The bureau has carried on an important series of tests on the impact on road surfaces, and other studies at Arlington, and a number of cooperative research projects have been instituted with State highway departments, State educational institutions, and other agencies. The bureau is cooperating with and supporting the National Research Council, in establishing a national research program on highway engineering and economic problems, which shall be so coordinated that attention shall be given the major problems, but that duplication of effort shall be eliminated. The bureau is also cooperating with the State highway departments through the American Association of State Highway Officials, in the work of developing and standardizing specifications, design, and practices for modern bridges and highways.

The attention of the committee is directed to the fact that in highway transportation we have a tremendous new force in the economic and social life of this Nation, which has not yet become stabilized, whose limits are not yet known, and whose ramifications touch the whole fabric of our agricultural, industrial, and social life. The building, maintenance, and operation of our highways are an integral part of highway transportation and, in fact, become the controlling element of the utilization of this form of transportation.

The carrying on of extensive and detailed studies of the present and possible uses of the highways, and the accumulation of essential economic data must be considered a necessary and vital part of the activities of the bureau.

It is my personal judgment that the major problems now confronting us with reference to the highway program are, first, the annual rate at which new construction should be undertaken, second, the financing of the costs of construction and maintenance, and the distribution of these costs, and third, the relation which highway transportation should occupy and maintain to other forms of transportation.

SALARIES.

Mr. ANDERSON. There is an apparent decrease of \$9,840 in your statutory roll?

Mr. MACDONALD. That decrease, Mr. Chairman, is due to the dropping of these places, all but two of which are not now filled.

Mr. ANDERSON. Can you get along without these employees that have been eliminated without any detriment to the service?

Mr. MACDONALD. All but two are places which may be eliminated.

FOR ROAD MANAGEMENT AND ECONOMIC STUDIES OF HIGHWAY CONSTRUCTION.

Mr. ANDERSON. Your next item appears to be the one on page 253:

For inquiries in regard to systems of road management and economic studies of highway construction, operation, maintenance, and value, either independently or in cooperation with the State highway departments and other agencies, and for giving expert advice on these subjects, \$66,800.

Mr. MACDONALD. The bureau is asking for no change in that item. Mr. Chairman. We are asking for the same appropriation that we had during the previous year. Last year we did not use all the funds. because we have been carrying on the work largely with personnel employed part time by the University of Wisconsin. This year we have organized it on a full-time basis and expect to use the entire fund.

Mr. ANDERSON. Will you tell us something about what you are doing and propose to do under this item?

Mr. MACDONALD. Under this item the bureau proposes to carry on a study of highway transportation extended along the same lines we have already begun. For example, in Connecticut we are carrying on a full year's study of the traffic over the highways. The plan covers the whole State, including the traffic entering and leaving the State, as well as the local traffic within the State. In detail, it is organized by districting the State tributary to certain roads over which traffic passes. Then key stations are established in each one of these districts, and full data of the traffic units is taken by the field counting party.

Mr. ANDERSON. What do you mean by "units"?

Mr. MACDONALD. I mean by that, each vehicle, the purpose for which it is being used, the number of passengers which are being carried, or the freight and the character of the freight that is being carried and its destination.

Mr. ANDERSON. Well, you mean that you establish somebody along these roads and they stop everybody that comes along?

Mr. MACDONALD. Yes. When we are making the count, we take the entire data with reference to the traffic that is going over the roads. These counts are taken in cooperation with the State highway department, which has authority over the traffic, but we have systematized the operation to such an extent that it is possible to take the data very quickly. This relates to the taking of the traffic count. There are other stations established, fewer in number, at which the traffic is actually diverted across scales and weighed to establish factors which will determine the weight when applied to all other units of traffic in the State.

Mr. ANDERSON. Do you get any objections on the part of people who are held up and diverted and are asked for information?

Mr. MACDONALD. Practically no objection from those who use the road in a proper manner. There has been some objection from those who desire to overload the trucks, but the traffic census and weighing has had a very salutary effect in the regulation of such traffic on the roads. For example, we found in the first traffic census that perhaps 75 per cent of the commercial truckers were overloading their trucks; that is, beyond the rated capacity, and they were doing that apparently as a means of increasing their compensation without regard to the detrimental effect upon the roads. Since scales were installed and the traffic count has been going on, the overloading has decreased to a large extent. In other words, it has resulted in restraining the traffic to the legal loads, and apparently the investigation has gained favor from the better class of truck operators and truck owners. Truck manufacturers particularly are upholding it.

I may say that the scales are installed by the State. We do not contribute to this expense. Half or more than half of the expense of the census will be paid by the State.

Mr. ANDERSON. In how many places is this traffic census being taken?

Mr. MACDONALD. We are carrying on this complete count in Connecticut. We have an informal agreement with the Massachusetts Highway Department, and we have been carrying on a less extensive survey there. We have during the year taken traffic counts on the county basis in Tennessee, and we have an extensive State-wide traffic census now going on in California in cooperation with the California Highway Department. We expect to add during the coming year similar studies in one or more typical agricultural States. These studies when completed we feel will give us a fair picture of the various typical traffic conditions which exist in the United States.

Mr. ANDERSON. What is this investigation the basis of—I mean, what do you expect will come out of it in the way of concrete results?

Mr. MACDONALD. Two very essential things will be matured out of such studies; first, the principles of regulation of traffic on the highways, so far as the use of motor transportation for the movement of commodities and passengers is concerned; and, second, the fees, or licenses, which may fairly be charged for the operation of motor vehicles upon the highways.

These are two immediately important matters in connection with the operation of our highways, the one of loading, speeds, and other proper regulations, and, the other the fair charges for the use of

the roads. Yet, this and other similar studies are basic in laying the foundation for the whole consideration of the economics of highway transportation.

Mr. ANDERSON. Has it been shown that the overloading of trucks beyond their rated capacity has had a detrimental effect upon the roads, as well as upon the trucks?

Mr. MACDONALD. Yes; in my judgment, that has been shown, as applied to the heavier trucks; that is, the detrimental results to the road are more pronounced if the heavier trucks are overloaded than if the lighter trucks are overloaded, but in any event, there is a more detrimental effect from overloading a truck of any capacity, than from the same load carried upon a truck properly designed to carry that load. This is due to the impact, of heavily-loaded wheels upon the roads. It is possible to multiply the static load, that is, the load of the truck standing still by seven, if a large obstruction on the road surface occurs, which drops the load on the highway. The average equivalent impact of the moving truck measured by the load of truck, stationary is about four times the latter and it does not require a very large obstacle to produce a very considerable impact, varying with the speed of the truck.

There is a long and involved task ahead of us to determine the relation between the motor vehicle and the road, but during the past year much progress has been made.

Mr. ANDERSON. Well, it would seem from that statement that the smoother the road and the better condition that it is kept in, the less will be the upkeep?

Mr. MACDONALD. That is very true, sir. That is one of the reasons why road maintenance becomes so absolutely important. An accurately circular smooth wheel passing over a perfectly plane road does not produce impact, but even a half-inch difference in the surface of the road, with a solid rubber tire produces considerable impact. On the Bates experimental road test in Illinois where the weaker stretches of road were actually tested to destruction, after the break started, it progressed along the road as much as 30 feet a day. Up to a certain point, the road carried the load, but as soon as the first break occurred, then the breaking down of the section occurred at the rate of 30 feet a day.

In addition to the traffic studies under this item, which we propose to carry on, we are making an analysis of highway finance, including the problems of the raising and expenditure of funds for highway purposes in the States, to determine the principles underlying the proper distribution of the cost between the several sources of revenues.

LAWS REGULATING TRAFFIC.

Mr. BUCHANAN. Let me get back to your first proposition for just a minute. You are taking the census of the amount of traffic going over the roads in certain States, the weights of the trucks, with an idea, I suppose, of a law limiting the amount any truck can carry or any vehicle can carry?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. Have any of these States got such a law?

Mr. MACDONALD. Practically all of the States have regulatory laws.

Mr. BUCHANAN. I am talking about the weight of trucks now.

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. They practically all have a law with regard to the weight of trucks?

Mr. MACDONALD. Yes; practically all of the States have regulatory laws on the weights of trucks.

Mr. BUCHANAN. Then, it is practically up to the State to determine whether any of its citizens, or any other citizens violate any law, and prosecute them for it?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. That is a criminal statute, is it not?

Mr. MACDONALD. Yes, sir. No, if you take the cold law for it, I suppose that would not be true; but these laws are not the result of investigations and scientific determinations, but simply opinions that were written into laws. The desires of the States are to secure a law that is based upon careful and accurate studies.

Mr. BUCHANAN. Then, this is true, is it not, that you are taking a census of the traffic, and so forth, with a view or arriving at what ought to be the law?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. Now, does the department pretend to have any power itself to prescribe any rules and regulations for the traffic, or as to what shall be the loads for these trucks?

Mr. MACDONALD. It is a part of our duty under the law to investigate and make recommendations as to the regulations which should be made effective.

Mr. ANDERSON. Yes; you have got that power.

Mr. BUCHANAN. That is what I am trying to get at.

Mr. ANDERSON. You have that power.

Mr. BUCHANAN. What I am trying to get at is as to whether you have any power to prescribe traffic regulations or not.

Mr. MACDONALD. No, sir. Not to prescribe regulations.

Mr. ANDERSON. You have power to make investigation and recommend regulations as to what the rules and regulations ought to be.

Mr. MACDONALD. Yes, sir; that is true.

Mr. BUCHANAN. Now, you say you have no power; that is, unless that power is conferred by an act of Congress. Do you think that this is a subject as comes under the jurisdiction of a State?

Mr. MACDONALD. We have no power under an act of Congress to prescribe these rules.

Mr. BUCHANAN. Have you ever thought of the question, then, of the Federal Government regulating the traffic loads on roads where Federal money goes into the road?

Mr. MACDONALD. Very seriously, sir. I have given it serious consideration, yet I hesitate to place anything in the record at this time.

Mr. BUCHANAN. There is no use of hesitating. We have got to face it sooner or later. It is a matter that we have got to consider sooner or later, and there is no use of hesitating. We might just as well come right out and consider it now.

UNIFORM TRAFFIC REGULATIONS ON FEDERAL AID ROADS.

Mr. MACDONALD. Under that assumption, it is with the idea of ultimately fixing uniform traffic regulations, that we are carrying on these studies in the various parts of the country. We believe

that those regulations will necessarily vary with different sections of the country. For example, in an agricultural State—I have recently been over a number of miles of roads in Texas, where, I believe, heavy truck traffic should not be allowed; that is, the heavy truck traffic necessary to the industries of the New England States is not necessary in large areas of Texas, where on many miles of highways there are sparsely settled agricultural communities only.

Mr. BUCHANAN. Certain stretches of highways that are not built for heavy trucks?

Mr. MACDONALD. No; and even though these roads were built for heavy truck traffic, there is not the traffic to demand heavy trucks, but rather trucks of the lighter type. The passenger car traffic is important.

Mr. BUCHANAN. And the heavy trucks result in serious injury to the roads?

Mr. MACDONALD. If they are loaded to the point of causing a break in the surface, and then every vehicle becomes a destroying agency: but until that break does occur the road serves the traffic without serious deterioration.

Mr. BUCHANAN. Then, my understanding of these studies that are being conducted, both with regard to the weight of the trucks and the amount of traffic, and so forth, is with the ultimate object of presenting to the people, or to Congress, the question as to whether or not there should be rules and regulations established by the Federal Government, either by Congress or by the department, with the authority of Congress, as to what traffic is going to go over the roads that the Federal money enters into the construction of throughout the Union?

Mr. MACDONALD. Yes.

Mr. BUCHANAN. With an idea of uniformity of traffic regulations so far as possible.

Mr. MACDONALD. Yes, sir; but I should like to qualify it to this extent, that we are approaching that end by these cooperative studies with the State highway departments of some of the States in which this problem has become acute, with the idea of establishing in those States, as nearly ideal laws as possible, in order that through and from actual experience the proper legislative authority will be able to fix wisely regulations in all States.

Mr. ANDERSON. In my part of the country, which is, as you know, largely agricultural, the thing that is tearing up the roads more than trucks, because we do not have a great deal of truck traffic at present, is the big busses that run up and down some of our highways, making regular runs of 150 or 200 miles a day, carrying 15 or 20 or 25 people.

Mr. MACDONALD. Over gravel roads, particularly in dry seasons of the year, the action of the tires of heavy, fast, busses is to ravel the top surface very rapidly.

Mr. BUCHANAN. You are speaking of gravel roads? Has the department come to any definite conclusion as to gravel roads being built by bond issues by counties, the bonds being issued for 30 or 40 years; is that not absolutely uneconomical?

Mr. MACDONALD. We do not think such practice is good. We think that it is very bad practice.

Mr. BUCHANAN. That is all that I want to know, all of which agree with.

MATERIALS USED IN ROAD CONSTRUCTION.

Mr. MACDONALD. I may say, Mr. Chairman, that we have a great many miles of gravel and macadam roads in the various States that are sufficiently strong to carry this present traffic, but the greatest deterioration, as you suggest, is the raveling and subsequent loss of material from the surface; particularly during dry seasons. In some places, a top of bituminous material is being used successfully over the old gravel or macadam road.

Mr. ANDERSON. That produces a rough surface when it begins to break up, doesn't it?

Mr. MACDONALD. You are speaking of the oiled gravel roads, I believe. The oiling of gravel has generally not proven successful. As soon as the surface begins to ravel, it becomes very rough. I referred to the practice of laying down an inch and a half, two inches, sometimes four inches of bituminous material on old compacted gravel or macadam roadways. However, it is doubtful if we will be able to use that construction in the northern States where there is much moisture and frost. In Texas, and in some of the southern and southwestern States such as Arizona, where there is no deep freezing, combined with a great deal of moisture in the ground, that type of construction is preserving old gravel and macadam roads at a very reasonable cost as compared with the cost of the modern paved highways.

That, I may say, is one of the objectives that we are continually striving for, the building of cheaper types of roads that will economically yet successfully carry the traffic.

Mr. BUCHANAN. Well, don't you think that the sooner we come to concrete as a base of public roads, the better for the States, counties, and Federal Government, and that these (three) other types of roads never last half the length of the life of the bonds that are issued, and that in case of bond issues for construction, that any road that does not last for the life of the bond, is a failure?

Mr. MACDONALD. But there is a great discrepancy now existing between the mileage of improved roads in the several States and the number of automobiles and motor vehicles that are needing to use them. You see, our registration of motor vehicles has passed the ten million mark, and it has only been within the past four years that we have carried on a large program of highway improvement and the task of bringing these roads up to a fit condition for the motor vehicle to use is a tremendous one. To give highway service it has been necessary to recognize the great demand for road mileage.

Mr. BUCHANAN. Well, what is your ideal road; concrete?

Mr. MACDONALD. No, sir; I do not think that concrete is necessarily the ideal road, because I can not disassociate ideal features of road construction from their cost, and if we can get a cheaper type of road that will serve the traffic—

Mr. BUCHANAN (interposing). Let me put the question differently. What would be the best road, regardless of the cost?

Mr. ANDERSON. Regardless of the cost?

Mr. BUCHANAN. Yes.

Mr. ANDERSON. That is not a fair question.

Mr. BUCHANAN. I do not mean an impracticable road or a road being built in a community that is not able to maintain it, or I do

not mean an impracticable, theoretical Utopian road, or an ideal that can not be realized.

Mr. MACDONALD. There is no single adequate answer to that question.

Mr. BUCHANAN. Well, there ought to be.

Mr. ANDERSON. Would not the answer to it depend upon the locality, the quality of the soil, and drainage?

Mr. MACDONALD. Yes, sir.

Mr. ANDERSON. And the amount of traffic would be one of the elements that would enter into it.

Mr. MACDONALD. To answer such a question fairly and practically I think that you would have to ask it about specific roads.

Mr. BUCHANAN. No; can you not make a concrete road, on any ground, and can you not without any great cost? It will cost a little more on some grounds than others for the foundation, but I can not see anything impracticable about the question. Here is a county that may issue two or three million dollars worth of bonds on the determination of bettering their roads, and I would like to know whether it would be better for them to put in a concrete road, a gravel road, or make—take the road that you were speaking of a while ago—gravel road with a surface on it. Now, that is not an impracticable question.

Mr. MACDONALD. Let me answer that from the viewpoint of practical experience. I do not care to put any particular county in the record.

Mr. BUCHANAN. You can put my county in if you want to. We recently had that problem up, Washington County, Tex.

Mr. MACDONALD. There is a county that issued bonds to build roads. They issued bonds in large amounts—\$2,000,000 or \$3,000,000 on two different occasions. They have constructed concrete roads only, and they are very good roads, but they have located some of them close together, within a half mile of each other.

It is my judgment that in that county—and we find now, with the prices of agricultural products dropped to a fraction of what they were when the bonds were issued, the people are finding the taxes to support the cost of those roads, along with the other expenses of the land itself, a difficult financial problem. I have been over that system of roads, and it is my judgment that they were right in building concrete roads on their main arteries, but that every traffic demand could have been satisfied on their side roads if they had built gravel or some lesser cost roads.

Mr. BUCHANAN. That is the answer to my question, the main arteries should have been built of concrete. You feel, then, that the earth roads are not satisfactory?

Mr. MACDONALD. Not for important roads, except in what we might call the plains regions where there are large areas, which are dry, are not subject to the action of frost, and where the soils are sandy.

Mr. BUCHANAN. In other words, except in the regions where we have natural roads?

Mr. MACDONALD. Well, I think that is a very good answer for it. When the traffic is too heavy in such localities for the natural soil I believe that a crushed stone or gravel road protected with a bituminous surface will prove satisfactory.

Mr. BUCHANAN. What would you recommend to go on a concrete road?

Mr. MACDONALD. Nothing, unless and until some surfacing is demanded.

Mr. BUCHANAN. I ask that question for information. In my own county we have built 32 miles of concrete road across the county which is just being completed now, and I just wanted to know whether you thought it was essential to have any surface.

Mr. MACDONALD. No, sir. If a concrete road is properly built and maintained there ought to be 15 years' wear, perhaps much longer, in the surface before there is any need for a new top.

Mr. ANDERSON. I have never seen a concrete road, and I have traveled over a good many miles of them, and I have never seen one that would stand up for 15 years without a surface.

Mr. MACDONALD. There is a very considerable mileage in California, built in 1909, is still carrying the traffic, but it is also true that some of the roads there have been retopped. The first concrete roads were not of the same quality as the best ones are now.

Mr. ANDERSON. Well, I have not done any traveling in California, which is perhaps the reason I have not seen any. I have never seen one that has stood up for 15 years, and I have traveled 70,000 miles of highway during the last 8 years.

Mr. MACDONALD. Mr. Chairman, if we are not getting 15 years' service or more out of the modern type of paved roads we are not building as good roads as we ought to build, and as can be built with the material which we have to use.

Mr. BUCHANAN. All right; I have taken up too much time on this, I guess.

Mr. MACDONALD. I think that covers, in a general way, this topic, Mr. Chairman.

FOR INVESTIGATING ROAD BUILDING AND MAINTENANCE.

Mr. ANDERSON. Your next item is:

For investigations of the best methods of road making, especially by the use of local materials; for studying the types of mechanical plants and appliances used for road building and maintenance; for studying methods of road repair and maintenance suited to the needs of different localities; and for furnishing expert advice on these subjects, \$77,060.

Perhaps you had better make a complete statement on that, as to what you are doing and expect to do.

Mr. MACDONALD. Under this item we have been making a number of studies of the use of local road materials, for example, in the Southern States, the use of sand-clay roads. We have found in the Southern States the need of a great deal of pioneering work, that is the cleaning, grading, draining, putting in the subdrainage where necessary and building the bridges and culverts. This character of work has required the available funds and has necessitated our using local cheap materials for surfacing, such as the sand clay and top soil. We also have been cooperating with the State of California, and the Columbia Steel Co., in the Pittsburgh, Calif., tests. In that project a circular track was constructed, and loaded trucks operated over the track. Different designs were used and both plain and reinforced concrete sections. The trucks were operated over the

track until sections of it were destroyed. A bulletin is now in process of preparation which will probably be ready this month, giving the results of the tests.

The State Highway Department of Illinois, also, built an experimental stretch of highway and raw truck traffic of controlled weight over it. The results of such tests and studies are leading to very material modifications in designing paved roadways and these modifications I believe will result in better roads, at perhaps a lower cost. It is estimated that new principles of design adopted in Illinois may save \$1,500 per mile in the cost and yet result in a more satisfactory and stronger road. The Bureau will cooperate with the Illinois Highway Department in carrying forward this study.

FOR INVESTIGATIONS OF THE CHEMICAL AND PHYSICAL CHARACTER OF
ROAD MATERIALS.

Mr. ANDERSON. The next is on page 257, "For investigations of the chemical and physical character of road materials, for conducting laboratory and field experiments and for studies and investigations in road design, independently or in cooperation with the state highway departments, and other agencies," and so forth. This is your laboratory item.

Mr. MACDONALD. That is the laboratory and also research item and we are omitting it from the appropriation requests of the Department now because under the Federal highway act, provision is made for carrying laboratory testing and investigational under our administration fund. The allotment of this item comes out of the administrative fund this year. I shall be very glad, if you wish, to go into the character of work we are carrying on.

Mr. ANDERSON. I think that we would be interested in your statement about what is being done under this.

Mr. MACDONALD. We must recognize the fact at this time that the whole science of modern road building is in the making, and because of this fact we are proceeding on the theory that the more extended the investigational and research work that the States and the Federal Government carry forward during this period the more efficient will be our use of the materials which are available for road building and the better will be the results which we obtain from the use of those materials. The science of highway building has many phases, all involving technical and detailed studies from which the practical results may seem to be only slowly developing. Not only is this true of the bringing to life of new principles, but also in establishing procedures to insure the application of knowledge already secured. For example, to control the quality of the materials going into Federal-aid projects the bureau does not attempt to make the tests in a central laboratory, but in cooperation with the States we do attempt to insure uniform standards of laboratory tests and practices, then uniform specifications for testing materials and the making of check tests. That is, the bureau keeps in close touch with all of the State laboratories in which the actual tests of road materials are made, and by constant cooperation and frequent check tests helps to keep the work of the State laboratories on a uniform basis. The bureau and the several State laboratories frequently make tests of the same material to compare methods and

results. Also testing engineers from the bureau visit the State laboratories and the State testing engineers visit the laboratories of the bureau. In this way a necessary result is being gradually secured which we may call the standardization of testing laboratories.

Again, the bureau has in process a long series of tests and research studies on bituminous materials. Under that as a major heading we are studying the shoving of bituminous pavements and other properties of bituminous surfaces. We are working on tests for the volatilization of petroleum products, the consistency of tars, and other tests which we are trying to bring down to the point of standardization for general use all over the country. Most of this work is in conjunction with the A. S. T. M. These are only indicative of the great many paths there are to follow during this period of development of modern road building. The researches of the bureau on non-bituminous materials and methods of testing are extensive and include the studies of the resistance to wear of concrete aggregates, the determination of deleterious substances in concrete aggregates, the action of alkali upon concrete, the use of blast-furnace slag for concrete aggregates, and a very extensive study of subgrades and subgrade materials.

RESEARCH STUDIES IN HIGHWAY ENGINEERING.

The bureau has endeavored and is endeavoring to stimulate research in the field of highway engineering, and in this connection has affiliated with the National Research Council, whose activities we are supporting in its efforts to establish a national program of highway research.

From the National Research Council there is a bulletin just now available which outlines a very long series of tests and researches which are now going forward all over the United States in the highway field, a complete census of highway research projects. In most of the major research projects the Bureau of Public Roads is either cooperating or is carrying on the tests independently. The bureau has taken the position that there exists in the State highway departments and at the colleges and universities of the country laboratories, plants, and equipment which are being used only to a partial capacity, and that without large additions to already existing plants and equipment it is possible to obtain a greater output from these laboratories. In many of them assistants are available who are not employed during vacation periods or who may be employed only part time with the colleges. In order to stimulate research and to make use of existing facilities the bureau has entered into cooperative agreements with a number of universities, including Purdue, Massachusetts Institute of Technology, Iowa State College, and other universities; also State highway departments, including the Connecticut State Highway Department, the California State Highway Department, the Illinois State Highway Department, and others.

It is our judgment that the funds which are being used for research purposes are perhaps the most productive and that this work should go forward on an increased scale continually. It is only through painstaking and exhaustive research that we shall arrive at determinations of the best designs for highways and the best uses to make of materials in their building.

Mr. ANDERSON. I have noticed a very considerable variation in the character of the roads resulting and the methods adopted in putting gravel on them. Have there been any experiments which have developed the relative strength of the road resulting from different kinds of gravel or methods which are more successful in putting them on, or do you simply use what you can get?

Mr. MACDONALD. The bureau has been making a very extensive series of studies of the behavior of gravel roads; in fact, some very good studies are now ready for publication. It is true that in the building of gravel roads on many of the main highways we have used the local materials which could be secured at the lowest cost even though not first class in quality. In such cases it is not expected to maintain the gravel surface indefinitely, but it does provide a temporary wearing surface while the newly built road grade is becoming compacted. As soon as the road bed is ready, or as soon as funds are available, paved surface is placed. If it is the intention to maintain the gravel road, more care is used in selecting and preparing the material.

Up to the present time in most of the States the Federal-aid work has been almost entirely on the main roads of the country, either constructing or reconstructing them. It is not physically practicable and funds are not available for building only paved roadways, thus we have been carrying forward the grading, draining, and preparatory work in advance of the more durable forms of surfacing. It is possible to do this type of improvement on a larger mileage each year than it is to follow up with the construction of paved-road surfaces. Also, it is in general better engineering if traffic conditions can be met to build the roadbeds some time in advance of the surfaces, and that plan has been widely used in all of the States where it is possible to obtain local materials for interim use, such as gravel, sand, clay, and similar materials. The difference in the service to the public and the saving in the cost of maintenance is considered to offset the cost of applying materials of this character.

The probabilities are, Mr. Chairman, in answer to your question, that the differences in results which you observe on different gravel roads, while partially due to the kind of materials used, are in a greater percentage of cases due to variations, first, in the character of the subgrade, and, second, in the traffic.

FOR MAINTENANCE AND REPAIRS OF EXPERIMENTAL HIGHWAYS.

Mr. ANDERSON. Your next item is for maintenance and repairs of experimental highways. I imagine that is a good deal of a misnomer, is it not?

Mr. MACDONALD. No, sir; our expenditures last year were all on experimental highways that we had built, although our principal expenditure was on the Mount Vernon road leading from the paved road into the grounds at Mount Vernon. That road was originally built as a surface-treated gravel road, and we have found it necessary, with the heavy traffic which has been developed, to regrade and rebuild a part. It is true that the gravel road is going to be an expensive type to maintain, but it would not be possible within any

small expenditure to improve the type up to the point where the maintenance would be greatly lessened. So we have considered requesting an appropriation for rebuilding not only that section of the road, but to rebuild all sections of the road between Washington and Mount Vernon that are not now improved with a paved surface, on the theory that Mount Vernon is a national institution, and that a road ought to be built connecting Washington, the National Capital, and Mount Vernon that would adequately care for the traffic, which is increasing at a tremendous rate.

FOR INVESTIGATING AND REPORTING UPON THE UTILIZATION OF WATER
IN FARM IRRIGATION.

Mr. ANDERSON. Your next item is for investigating and reporting upon the utilization of water in farm irrigation, including the best methods to apply in practice, etc.

Mr. MACDONALD. The work in irrigation is carried on under the Division of Agricultural Engineering, and in the estimates submitted to your committee there are no increases in any of the items allowed. The appropriation for carrying on the work in irrigation is the same as the amount we had last year, and is practically the same amount it has been for the last five years. It has averaged about \$70,000 per year.

I may say in connection with all of our work in agricultural engineering we are endeavoring to get away from the class of activities which may be termed service or extension, such as the sending out of engineers to give advice on specific problems and to concentrate on the research problems entirely. In future probably 75 per cent of our activities will consist of research work and only 25 per cent of service or extension. During the war there was a large demand for service work, but since we have taken the position that State organizations, where the States maintain organizations, should do this work. We have cooperative agreements with several of the western States, including California, Nevada, Utah, New Mexico, Colorado and Texas. There will always be the exception of giving advice or help where there are large problems involving the specialized knowledge developed through research and investigational studies. To abandon these lines of activity entirely would throw us out of touch with the practice and problems of new irrigation and drainage development and render it difficult to plan and carry out research work in such a way as to be of the greatest benefit to water users.

Mr. ANDERSON. If my recollection is correct, this item does not have to do particularly with the mechanical operations, but rather with the agricultural operations?

Mr. MACDONALD. It has to do with the agricultural operations; that is, a study of the use of water in irrigation. It does not conflict with the work of the Reclamation Service. In fact, it is the only service of this character which the Federal Government is rendering the very large number of people who are operating irrigated lands that have not been developed by the Federal Government but by private or community enterprises. I believe that the Federal irrigation projects include about 10 per cent of the total irrigated lands.

STUDY OF WATER REQUIREMENTS OF CROPS.

One of the projects which we have under way now consists of a study of the duty of water, or the water requirements of crops. We are making a comprehensive study of the results which have been obtained over the past 10 or 15 years, with the idea of publishing a series of articles on this particular subject, which, in my judgment, is the most important subject we have to deal with. A large amount of unpublished data has been and is being accumulated, the publication of which will prove valuable to State officials in apportioning the flow of streams, to courts in settling rights to the use of water, to engineers in determining the capacities of irrigation channels and structures, to canal managers in framing water-right contracts, and to farmers in growing crops.

Another project is the percolation of water through earth dams. Any loss of water through the retaining structures, if it can be avoided ought to be avoided, and this project involves research in reference to the best types of earthen dams to build, the kind of core walls, and the pavements and drains necessary as a part of those structures.

Another subject is the water-holding capacity of irrigated soils. This subject involves a study of the movement of water downward through soils and subsoils by the action of gravity and also the distribution of soil moisture in all directions by the action of capillarity.

There are also studies now in progress dealing with drainage structures for irrigated farms. This will embrace the principles of design which practice and results of experiments indicate to be the most satisfactory in reducing cost and increasing efficiency of the various structures used in drainage systems.

HYDRAULIC EXPERIMENTS.

In cooperation with some of the States we are carrying on a number of hydraulic experiments, chiefly for the purpose of developing instruments for water measurement and also for measuring evaporation.

Mr. ANDERSON. Has there been any development of economical pumping machinery?

Mr. McCORRY. We have made a study of the cost of pumping and have also a bulletin on the subject of pumping from wells for irrigation ready to submit for publication. There has been a considerable increase in the efficiency of deep-well pumps in the last 10 or 15 years; in fact, irrigating pumps generally have increased in efficiency considerably in the last 10 years. Fully 30,000 pumps are now supplying water to more than a million acres of land, much of which is in crops of very high value. We estimate that not less than 70 per cent of the irrigated lands of the coastal region of southern California, comprising the highest priced agricultural lands of the West, are watered by pumping plants.

Mr. MACDONALD. We have been making a study of the cost of developing irrigated farms to the point of profitable returns. The cost of storage works, distributing systems, and other features of the irrigation systems of the West, and the average cost of such construction, as an acreage cost against the lands served are definitely known. Our study is bringing out the interesting fact that the original cost of placing water on the land is only a portion of the cost of bringing that farm up to a state of productivity.

FOR FARM DRAINAGE AND DRAINAGE OF SWAMP AND WET LANDS.

For farm drainage we are asking the same appropriation that we have for this year. In our research work we are attacking a few of the outstanding problems—those which are the foundation of effective and economical drainage.

The work in Minnesota with regard to the effects of soil alkalies and acids upon the durability of concrete tile is being continued in cooperation with the College of Agriculture of the University of Minnesota, and the State department of drainage and waters. Definite progress is being made on this project. Largely as a result of this work in Minnesota concrete tile manufactured in the State has improved in quality. When the work was begun large tile did not meet the absorption requirements of the American Society for Testing Materials, i. e., 11 per cent. Tests of 154 tile made by 17 plants during the past year showed that about one-half of these plants are now making tile averaging between 6 and 7 per cent absorption. The work we are doing in Minnesota is receiving the cordial support of the tile manufacturers, who fully appreciate the necessity of research in order to improve the quality of tile made.

During the last fiscal year an engineer was stationed at Cape Girardeau, Mo., to make a systematic study of the flow of water in a large floodway that is a part of the Little River drainage district. Valuable information was secured as to the elements that affect the flow of such channels. The use of floodways in connection with large drainage undertakings undoubtedly will increase and reliable information as to the flow in such channels is essential to their proper design.

The effect of tile upon the ground water table has received the attention of the bureau for several years. The purpose of these investigations is to acquire an adequate basis for determining the proper depth and spacing of drains in the various soils. A study with regard to the effect of tile in the sandy soils of the coastal plain of North Carolina was completed last year and a report prepared. The opportunities for study along this line are as numerous as are the types of soil and the variations of rainfall, and the work should be continued.

The study of the use of sedimentation basins as a means of preventing the deposit of silt in main drainage channels in the Middle West has been continued. The purpose of such basins, which are constructed in branch drains, is to catch and retain silt washed down from the hills before it reaches the main channels. The subject is a very important one as it is believed that the proper location and construction of such basins will help to solve the silting problem which at present is a very serious one.

At the request of interested landowners a study was made as to the possibility of draining successfully certain impervious soils by the use of tile in the Yazoo Delta, Miss. The landowners claimed these soils could not be successfully drained. Our investigations, however, showed that the difficulty was largely improper design and construction.

In cooperation with the Office of Farm Management and Farm Economics, a study has been completed of the economic results that have been obtained in two drainage districts in North Carolina.

The behavior of drainage pumping plants in Texas and Louisiana, the operation of which had previously been studied by the bureau, was investigated in order to determine how the different types of plants were working, what difficulties were encountered, and what changes should be made in the recommended practices.

In our drainage work we are emphasizing research—the study of the basic problems of farm drainage. I feel that the instruction of the individual farmer in his specific problems is a matter that can now well be left largely to the State Extension Service. We are, nevertheless, carrying on some extension work in cooperation with certain States that agree to bear a part of the expense of such work. This year we have such agreements with Alabama, Arkansas, Georgia, North Carolina, West Virginia, and Tennessee.

FOR INVESTIGATING FARM DOMESTIC WATER SUPPLY AND DRAINAGE DISPOSAL.

Mr. ANDERSON. Your next item is for investigating farm domestic water supply and drainage disposal.

Mr. MACDONALD. That request remains the same as this year.

Mr. ANDERSON. What is this item particularly directed to?

Mr. MACDONALD. I should say the major studies we wish to carry on under this item are two—researches with reference to farm buildings, particularly barn ventilation, and storage houses for different kinds of crops; and farm power studies.

We believe that, from the agricultural standpoint, one of the greatest advances that we will have to make in the future is in connection with the storage of what we regard now as perishable crops over a length of time so as to depress the peak and distribute such crops over a longer period of time.

Mr. ANDERSON. Do you have reference to farm storage or commercial storage?

Mr. MACDONALD. Particularly to farm storage, but I assume the principle would be applicable to either. I had reference particularly to farm and community storage, such as tobacco barns, and potato, apple, and fruit storage facilities. We have made considerable progress in the successful storage of sweet potatoes, and the tobacco crop seems to offer similar desirable fields for study.

The bureau is concerned in establishing the principles of design which should underlie the construction of buildings for special agricultural purposes, believing that if these principles are established any architect or builder can use them in producing satisfactory buildings.

Great yearly losses occur in tobacco barns during the firing and curing of the crop due to improper ventilation or improper construction. There is also room for improvement in the arrangement of these barns by which considerable saving in labor may be made. It is expected that this work will be done in cooperation with the Bureau of Plant Industry and with one or more of the agricultural colleges in tobacco-growing States.

VENTILATION OF DAIRY AND OTHER BARNs.

In the ventilation of dairy and other barns there is need for further investigation. We have already prepared a bulletin based on

investigations made to determine which are the variable and constant factors entering into the problem. We are now planning further study with a view to determining the laws which govern these variations, so that they may be applied in the designing of ventilating systems.

We are constantly asked for information regarding the storage of potatoes, apples, and other products. In cooperation with the Bureau of Plant Industry we have prepared material indicating the proper construction of common apple storage houses for the northwest. It is expected that the investigation will be carried further in order to determine the proper construction for other sections of the country and to develop similar information with respect to the storage of other crops.

Another investigation which is thought advisable is that relating to silage pressures. The size and height of silos have greatly increased, introducing new problems in the design of silos which will withstand the increased pressures. At present there is no definite information with respect to this. There have been failures due to improper construction; in other instances an unnecessarily expensive design has been used. The development of silage packers has made it possible to store a greater quantity in the same silo, but this means an increased but unknown pressure. In view of the fact that silos are increasing in number at the rate of from twenty to forty thousand a year, the result of this investigation should bring about a reduction in the number of failures and a saving in material.

The transportation and handling of fruits and vegetables involve many engineering problems which are yet to be solved. It is thought the precooling of fruits offers a means of reducing losses in transportation and storage. In cooperation with the Bureau of Plant Industry it is expected to continue investigations now under way in order to determine the effectiveness of precooling.

It is planned also to undertake further investigations relative to the factors that govern the design and operation of car-heating systems, with the object of developing a more efficient system of heating cars used in the transportation of perishable foodstuffs, and to thus reduce the heavy losses which occur at certain seasons. The problem of a satisfactory heater car is of great importance to potato growers in the North and to fruit and vegetable growers throughout the country.

Similarly the refrigerator car, so necessary to the successful transportation of perishables during warm weather, is still susceptible to great improvement, although a great deal of work has been done along this line. It is believed that the losses which occur each year justify a considerable expenditure to reduce them.

The farm power studies outlined by the farm power committee of the department have been continued. In cooperation with the Bureau of Animal Industry and the Office of Farm Management and Farm Economics a study of the cost of power on farms in the winter wheat belt in Nebraska, Kansas, and Oklahoma, was made. Records were secured from 354 farms where tractors were used, and from 85 farms where horses only were used. A complete record of the work done with both horses and tractors during the year preceding the investigation, and information from which the cost of using the tractors and horses could be determined, were obtained from each farm. A record of the changes in the operation and organization of

the farm after the purchase of tractors, and statements from each farmer concerning the advantages and disadvantages of a tractor on his farm, were obtained. A summary of this investigation has been published.

Several years ago information in regard to the experience of farmers with motor trucks was secured from truck users throughout the United States. The experiences of farmers in the Corn Belt and in the New England States were compiled as department bulletins. During the last year the farmers whose experiences were reported in these publications were again circularized, and the information secured is being prepared for publication as farmers' bulletins in order that the experiences of these farmers with motor trucks, which now extend over a period of several years, may be available as a guide to other farmers contemplating the purchase of motor trucks.

In cooperation with the Bureau of Animal Industry a study is now in progress which has for its object the determination of the amount of power developed by horses and the ways in which this power may be utilized most efficiently in farm operations. It is known that many of the hitches used at the present time result in a waste of power, and it is planned to determine the effect of various factors on the efficiency of hitches and, if possible, to develop better hitches. The importance of increasing the efficiency of animal power may be better appreciated when it is known that with some common hitches used for plows the work of one horse is used, overcoming side drafts. The amount of horsepower used on the farms of the United States is equal to 80 per cent of the total horsepower used by all other industries combined. Information of great value to all farmers could undoubtedly be secured if these investigations could be prosecuted vigorously with an adequate force.

The investigation now being carried on in cooperation with the Bureau of Entomology relative to the control of the cotton boll weevil will be continued. A new phase of this work is the introduction of the airplane in dusting the cotton fields with poison. Experiments already made indicate possibilities that make it highly desirable to continue the investigation. Results of an unexpectedly gratifying character have been obtained, but whether the airplane can be used commercially is yet to be determined.

SURPLUS WAR EXPLOSIVES.

Mr. ANDERSON. Your next item is for supervising the preparation, distribution, and use of picric acid, trinitrotoluol, trojan powder, and such other surplus war explosives as may be made available for use in clearing stumps and stones from agricultural lands.

Mr. MACDONALD. During the fiscal year 1922, 3,264,800 pounds of cartridged picric acid were distributed. This distribution we expect to continue as long as the supply holds out, and we have obtained nothing but favorable reports from the farmers who have used the material.

Mr. ANDERSON. I understand this material does not deteriorate!

Mr. MACDONALD. That is indicated by our experience after it is cartridged. It is tested, before cartridging, for the moisture content, and the cartridges are paraffined, so the explosive ought to last for a considerable time after it has been received. Picric acid

requires a somewhat heavier detonator than T. N. T. or other commercial explosives.

An interesting side light on that distribution is the fact that this supply has been available to the farmers at a very nominal cost, 6 cents for cartridging and not over 1 cent for handling, plus freight charges, and that has apparently led to a remarkable drop in the price of commercial explosives. The prices have come down to a point now that we are finding some difficulty in disposing of this supply at a price around 7 cents f. o. b. The availability of this supply to the farmers may be only one of the causes, but it is true that the prices of commercial explosives has come down to very much lower levels.

Mr. ANDERSON. How much of this explosive is left?

Mr. MACDONALD. It is now about 4,000,000 pounds.

Mr. ANDERSON. At the rate you have been going you will get rid of it in about a year or two?

Mr. MACDONALD. Yes, sir.

FOR GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. There is no change in your item for general administrative expenses?

Mr. MACDONALD. No, sir.

EXCHANGE OF PASSENGER-CARRYING VEHICLES.

Mr. ANDERSON. We will next take up the item on page 322, and particularly the proviso which relates to the exchange of passenger-carrying vehicles.

Mr. MACDONALD. With reference to the authority requested under this item to exchange used passenger-carrying vehicles or parts for new vehicles, we now find ourselves confronted with this situation: Under the acts of Congress which turned over to the department for distribution to the States certain surplus war equipment suitable for road-building purposes, the department is authorized to retain for use in its road work not more than 10 per cent of the equipment. That included all kinds of equipment, such as trucks, automobiles, tractors, tents, and miscellaneous equipment of all kinds. All of the passenger motor vehicles which were taken over had been used. We have received only cars which had been used to a considerable extent and that had not been well maintained, as you would expect under the then existing conditions, so in attempting to use these vehicles—and I may say that the distribution started nearly four years ago—we find these vehicles have deteriorated to an extent that it is very expensive to maintain them.

We have no authority to trade these in for new vehicles that could be operated at less expense, and no authority to pay the difference between their trade-in value and the cost of new cars. We have also taken over from the War Department a considerable amount of spare parts. All of the nonstandard motor vehicle parts were declared surplus by the War Department and turned over to the Department of Agriculture for distribution. There had been large purchases made of spare parts, so that along with the motor vehicles, spare parts became surplus sometimes out of proportion to the number of vehicles to be maintained. We now find that some of the manufacturers are rather anxious to trade for some of these spare parts in exchange for new motor vehicles; that

exchange at cost price can be made. Whether that is due to the fact that the companies are no longer making these particular parts and need them for the repair of the older models still in use or not I do not know, but the proposition would be in the interests of economy.

USE OF MOTOR VEHICLES IN ROAD-BUILDING ACTIVITIES.

The use of motor vehicles is absolutely essential for the economical and efficient conduct of the road-building activities of the bureau. The number of engineers assigned to each State to give general inspection to the conduct of the Federal aid road projects is very limited, and each man is expected to cover a large territory and keep in personal touch with all the projects in that territory. Also, the building of forest highways is dependent upon motor transportation. Many projects are built far away from railroads and from the necessary supplies. The efficiency of the work of field survey parties, inspection engineers, superintendents of construction, and, in fact, of the whole organization of the bureau engaged upon road work is predicated upon adequate transportation over the highways. In Washington and at several points in the field we have established shops in which we are attempting to repair and rehabilitate these used machines, so that they can be distributed and used in the service where needed. Many of the machines taken over are fit only for such salvage parts as may be secured from them. Our principal use is for cars of the latter type, such as Fords and Dodges, except where it is necessary to send out a larger party on surveys, and we believe that a real saving can be made if authority herein requested is granted.

The number of cars in actual service varies from month to month, depending upon the amount of road building that is going forward, the number of survey parties in operation, and the number of forest highway construction projects. Our November report shows in actual operation 64 Fords and 63 cars of other makes in use on general operations, and 48 assigned to specific projects. Because of the age and the use which has been made of these cars, we estimate there should be at least a 30 per cent replacement during the fiscal year, and we request therefore specific authority to expend not to exceed \$29,000 from the administrative Federal aid fund for this purpose.

Mr. ANDERSON. Do I understand that this proviso applies only to passenger-carrying vehicles which were turned over by the War Department and retained by the Secretary of Agriculture for use in connection with highway work?

Mr. MACDONALD. Yes, sir.

Mr. ANDERSON. Were there any passenger vehicles turned over to the States?

Mr. MACDONALD. Yes, sir.

Mr. ANDERSON. But this does not apply to them?

Mr. MACDONALD. No, sir; such vehicles belong to the several States and are subject to the jurisdiction of the State highway departments.

Mr. ANDERSON. Can you give us an idea as to how many machines are involved in this proposition? As far as this language goes, they are all involved.

I can see where machines which have been operated for two or three years, and probably were not very good when you got them,

have deteriorated to a point where the upkeep is very great. Now, it would cost less money, probably, to trade some of those machines in than it would to simply drive them off into a ditch and leave them, because you should get as much salvage value as there is in them. That is a perfectly understandable proposition.

Mr. MACDONALD. I should like to have in the record, too, the fact that this transportation is absolutely necessary for the carrying on of our work. I have just investigated some of our operations in New Mexico, for example, and in order to cover the Federal aid projects we have there now, by the use of automobiles, we have arranged four trips which require two weeks each, that is, it takes eight weeks to cover the projects which are going on there now. Those projects could not be covered if we attempted to use trian service, because it does not exist. The same thing is true in the national forests. The ranges of mountains, as you know, run largely north-east and southwest, and the forest areas occupy largely the mountain ranges, while our transcontinental highways run from the east to the west, so that we have inherited with the national forests the liability of building through the worst sections of land that are encountered; that is, crossing the mountain ranges; the valleys lying in between are not in the forest reserves, but the forest reserves lie on the mountains and we are running at right angles to them and crossing them at the best passes we can find. So that transportation is not only absolutely necessary from the standpoint of carrying on the work, but from the standpoint of saving as much time as possible, especially where the roads are open for only a few months throughout the year.

Mr. ANDERSON. Are these cars used by your supervising engineers inspectors, etc.?

Mr. MACDONALD. Yes, sir.

We have been administering the Federal road act since 1916 and we have never bought one new automobile for that purpose.

Mr. ANDERSON. We understand what you are trying to get at and when we come to write up the bill we will put in what the committee is willing to carry.

What is to be said about the second proviso?

Mr. JUMP. When Mr. Reese was here he fully explained that proviso and I will merely reiterate what Mr. Reese said the other day. We would like to secure authority to use several of the second-hand machines which the Bureau of Roads has taken over from the War Department for the ordinary work of the department in Washington.

MONDAY, NOVEMBER 27, 1922.

COOPERATIVE CONSTRUCTION OF RURAL POST ROADS.

Mr. ANDERSON. Mr. MacDonald, we will take up the item on page 360 with reference to the construction of post roads.

Mr. MACDONALD. Mr. Chairman, under the various Federal aid road acts the department has been carrying on cooperative road building with the several States, and the mileage of highways which have been completed and paid for under the several acts providing Federal funds, by States, by types, and by fiscal years, is shown on the table which I am submitting for the record.

(The table referred to follows.)

Statement of the mileage of highways completed under the Federal aid act arranged by States, by types, and by fiscal years. June 30, 1922.

| Geographic divisions and States. | Graded and drained. | | | | Sand clay. | | | | Gravel. | | | | Water-bound macadam. | | | | Bituminous macadam. | | | |
|----------------------------------|---------------------|-------|-------|---------|------------|------|------|-------|---------|---------|------|-------|----------------------|---------|---------|------|---------------------|-------|-------|--------|
| | 1919 | 1920 | 1921 | 1922 | Total. | 1919 | 1920 | 1921 | 1922 | Total. | 1919 | 1920 | 1921 | 1922 | Total. | 1919 | 1920 | 1921 | 1922 | Total. |
| Totals for all States..... | 10.0 | 203.0 | 347.2 | 1,635.5 | 2,185.6 | 46.7 | 90.0 | 384.1 | 1,117.4 | 1,638.5 | 55.2 | 247.8 | 1,293.1 | 3,448.4 | 5,044.3 | 11.7 | 41.4 | 304.9 | 357.8 | 496.1 |
| New England..... | | | | | | | | | | | | | | | | | | | | |
| Maine..... | | | | | | | | | | | | | | | | | | | | |
| New Hampshire..... | | | | | | | | | | | | | | | | | | | | |
| Vermont..... | | | | | | | | | | | | | | | | | | | | |
| Massachusetts..... | | | | | | | | | | | | | | | | | | | | |
| Rhode Island..... | | | | | | | | | | | | | | | | | | | | |
| Connecticut..... | | | | | | | | | | | | | | | | | | | | |
| Middle Atlantic..... | | | | | | | | | | | | | | | | | | | | |
| New York..... | | | | | | | | | | | | | | | | | | | | |
| New Jersey..... | | | | | | | | | | | | | | | | | | | | |
| Pennsylvania..... | | | | | | | | | | | | | | | | | | | | |
| East North Central..... | | | | | | | | | | | | | | | | | | | | |
| Ohio..... | | | | | | | | | | | | | | | | | | | | |
| Illinois..... | | | | | | | | | | | | | | | | | | | | |
| Michigan..... | | | | | | | | | | | | | | | | | | | | |
| Wisconsin..... | | | | | | | | | | | | | | | | | | | | |
| West North Central..... | | | | | | | | | | | | | | | | | | | | |
| Minnesota..... | | | | | | | | | | | | | | | | | | | | |
| Iowa..... | | | | | | | | | | | | | | | | | | | | |
| Missouri..... | | | | | | | | | | | | | | | | | | | | |
| North Dakota..... | | | | | | | | | | | | | | | | | | | | |
| South Dakota..... | | | | | | | | | | | | | | | | | | | | |
| Nebraska..... | | | | | | | | | | | | | | | | | | | | |
| Kansas..... | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-----|-------|-------|------|------|------|-------|
| South Atlantic..... | 16.5 | 117.9 | 134.4 | 10.4 | 26.3 | 246.2 | 893.0 | 151.0 | 8.0 | 2.3 | 16.6 | 135.6 | 162.5 | 4.2 | 3.7 | 29.5 | 37.3 | 4.5 | 42.0 | 93.4 | 139.9 |
| Maryland..... | | 2.7 | 2.7 | | 12.0 | 33.6 | 28.4 | 74.1 | | 2.3 | 3.0 | 20.9 | 23.9 | | 1 | 26.1 | 33.9 | 4.5 | 22.8 | 27.3 | |
| Virginia..... | | 48.7 | 48.7 | | | | 1.0 | 253.0 | 8.0 | | 3.5 | 7.2 | 12.9 | 4.2 | 3.6 | 2 | 2 | 5.2 | 16.9 | 16.9 | |
| West Virginia..... | | 10.6 | 21.6 | 32.2 | | 90.4 | 162.5 | 269.4 | | | 5.8 | 26.0 | 39.8 | | | | | 5.2 | 27.9 | 33.2 | |
| North Carolina..... | | | | | | 50.4 | 269.4 | 319.8 | | | 4.3 | 32.3 | 36.6 | | | | | 3.0 | 10.6 | 10.6 | |
| South Carolina..... | | 5.9 | 44.9 | 50.8 | | 14.3 | 401.5 | 487.5 | | | | 49.2 | 49.2 | | | 3.1 | 3.1 | 10.9 | 38.0 | 48.9 | |
| Georgia..... | | | | | 10.4 | | 5.1 | 15.6 | | | | | | | | | | | | | |
| Florida..... | | | | | | | | | | | | | | | | | | | | | |
| East South Central..... | 41.6 | 120.6 | 162.3 | 36.3 | 43.9 | 81.4 | 33.2 | 194.9 | | 18.6 | 99.2 | 191.8 | 309.6 | | 5.0 | 29.0 | 34.0 | 4.9 | 23.7 | 28.6 | |
| Kentucky..... | | 77.3 | 77.3 | | | | | | | | | | | | 5.0 | 16.7 | 21.7 | 4.9 | 6.2 | 10.1 | |
| Tennessee..... | | | | | | | | | | | | 2.8 | 2.8 | | | 12.3 | 12.3 | | 18.5 | 18.5 | |
| Alabama..... | 3.2 | | | 3.2 | 36.3 | 43.9 | 81.4 | 33.2 | 194.9 | 14.5 | 44.9 | 37.7 | 97.1 | | | | | | | | |
| Mississippi..... | 38.4 | 43.3 | 81.8 | | | | | | | 4.1 | 54.3 | 151.2 | 209.7 | | | | | | | | |
| West South Central..... | 40.6 | 78.2 | 118.8 | | | | 29.4 | 29.4 | 32.6 | 126.6 | 249.3 | 946.8 | 1,355.3 | 3.7 | 6.0 | 448.4 | 188.1 | 6 | 3.0 | 16.9 | |
| Arkansas..... | | | | | | | | | | 23.2 | 17.2 | 238.4 | 278.7 | | | 18.3 | 18.3 | | 3.0 | 3.0 | |
| Louisiana..... | 7.4 | | 7.3 | | | | 1.6 | | | 51.0 | 48.0 | 167.9 | 266.9 | | | 3.2 | 3.2 | | | | |
| Oklahoma..... | | | | | | | | | | | | 48.8 | 48.8 | | | | | 6 | | 6 | |
| Texas..... | 33.2 | 78.2 | 111.5 | | | | 27.8 | 27.8 | 32.6 | 52.4 | 184.2 | 491.7 | 760.9 | 3.7 | 6.0 | 236.9 | 136.7 | | 16.9 | 16.9 | |
| Mountain..... | 112.6 | 100.3 | 316.0 | 528.9 | | 7.9 | 44.7 | 131.8 | 184.3 | | 149.2 | 786.9 | 936.2 | | | 29.5 | 29.6 | | 1.4 | 1.4 | |
| Montana..... | | 131.8 | 131.8 | | | | | | | | | | | | | | | | | | |
| Idaho..... | 21.4 | 49.0 | 35.7 | 106.1 | | | 18.6 | 18.6 | | | 4.7 | 284.1 | 288.8 | | | 16.0 | 16.0 | | 1.4 | 1.4 | |
| Wyoming..... | 73.8 | 8.0 | 21.7 | 103.5 | | 4.7 | 39.6 | 80.1 | | | 7.0 | 236.7 | 243.7 | | | 4.3 | 4.3 | | | | |
| Colorado..... | 8.9 | 28.3 | 57.7 | 95.0 | | 3.1 | | 33.1 | | | 38.1 | 42.7 | 80.8 | | | | | | | | |
| New Mexico..... | | | | | | | | | | | | 42.1 | 42.1 | | | | | | | | |
| Arizona..... | | 8.3 | 16.0 | 24.2 | | 5.1 | | 5.1 | | | 73.1 | 61.0 | 134.2 | | | | | | | | |
| Utah..... | 4.0 | 32.7 | 36.7 | | | | | | | | 5.7 | 79.1 | 84.7 | | | | | | | | |
| Nevada..... | 8.5 | 2.7 | 20.0 | 31.2 | | | | | | | 20.6 | 41.2 | 61.8 | | | 9.3 | 9.3 | | | | |
| Pacific..... | 15.6 | 46.3 | 124.5 | 186.4 | | | | | 9.3 | 38.7 | 175.5 | 242.7 | 466.2 | | 2.8 | 22.9 | 25.6 | | | | |
| Washington..... | | 8.0 | 16.3 | 24.4 | | | | | | | | | | | | | | | | | |
| Oregon..... | 15.6 | 9.3 | 71.8 | 96.7 | | | | | 9.3 | 29.4 | 110.8 | 56.2 | 207.6 | | | | | | | | |
| California..... | 29.0 | 36.4 | 65.3 | | | | | | | | 9.3 | 64.7 | 184.5 | 258.5 | | 2.8 | 22.9 | 25.6 | | | |

Statement of the mileage of highways completed under the Federal aid act arranged by States, by types, and by fiscal years, June 30, 1922—Continued.

| Geographic divisions and States. | Bituminous concrete. | | | | | Portland cement concrete. | | | | | Brick. | | | | | Bridges. | | | | | Total—all types. | | | | |
|----------------------------------|----------------------|-------------|-------------|-------------|-------------|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------|-------------|-------------|-------------|------|
| | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | |
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| Total for all States..... | 6,819,519 | 7,159,139 | 7,601,772 | 8,483,322 | 127,772 | 762,015 | 5,711,712 | 5,821,826 | 6,208,673 | 0 | 2 | 9 | 4 | 3,19 | 9,25 | 2,12 | 5,160 | 3,729 | 6,2 | 900,69 | 551 | 6 | 13,354 | 7 | |
| New England..... | 7.4 | 7.5 | 12.5 | 30.7 | 58.2 | 113.3 | 2.2 | 5.3 | 3.5 | 49.5 | 60.5 | 113.3 | 2.2 | 5.3 | 3.5 | 49.5 | 60.5 | 113.3 | 2.2 | 5.3 | 3.5 | 49.5 | 60.5 | 113.3 | |
| Maine..... | 4.7 | 2.1 | 12.5 | 1.0 | 20.3 | 30.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | |
| New Hampshire..... | 2.7 | 1.8 | 12.4 | 16.9 | 2.2 | 35.0 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | |
| Vermont..... | 3.6 | 17.3 | 21.0 | 2.3 | 5.3 | 48.5 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | |
| Massachusetts..... | 4.7 | 2.1 | 12.5 | 1.0 | 20.3 | 30.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 5.6 | |
| Rhode Island..... | 2.7 | 1.8 | 12.4 | 16.9 | 2.2 | 35.0 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 11.8 | |
| Connecticut..... | 3.6 | 17.3 | 21.0 | 2.3 | 5.3 | 48.5 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.4 | |
| Middle Atlantic..... | 26.3 | 33.2 | 59.4 | 2.6 | 3.0 | 111.7 | 395.1 | 512.4 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 |
| New York..... | 26.3 | 33.2 | 59.4 | 2.6 | 3.0 | 111.7 | 395.1 | 512.4 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 |
| New Jersey..... | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 10.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 10.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 10.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 10.0 | |
| Pennsylvania..... | 26.3 | 30.5 | 56.8 | 2.6 | 3.0 | 72.5 | 274.9 | 353.0 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 | 22.7 | 9.3 | 13.4 |
| East North Central..... | 9.8 | 16.0 | 53.2 | 79.1 | 3.2 | 40.4 | 110.5 | 906.7 | 1,080.7 | 12.6 | 14.7 | 3.1 | 112.0 | 142.5 | 0 | 4 | 18.8 | 130.2 | 280.6 | 1,685.5 | 2,115.3 | 0 | 4 | 18.8 | |
| Ohio..... | 9.4 | 5.4 | 37.9 | 52.7 | 3.2 | 60.9 | 127.3 | 160.9 | 12.6 | 14.7 | 101.6 | 128.9 | 0 | 4 | 18.8 | 130.2 | 280.6 | 1,685.5 | 2,115.3 | 0 | 4 | 18.8 | 130.2 | 280.6 | |
| Indiana..... | 4.7 | 7.3 | 12.0 | 4.9 | 74.7 | 79.7 | 33.6 | 79.7 | 33.6 | 79.7 | 101.6 | 128.9 | 0 | 4 | 18.8 | 130.2 | 280.6 | 1,685.5 | 2,115.3 | 0 | 4 | 18.8 | 130.2 | 280.6 | |
| Illinois..... | 4.7 | 8.1 | 8.1 | 37.4 | 508.4 | 545.8 | 37.4 | 508.4 | 545.8 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | |
| Michigan..... | 4 | 5.9 | 6.3 | 14.3 | 59.6 | 73.8 | 14.3 | 59.6 | 73.8 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | |
| Wisconsin..... | 4 | 5.9 | 6.3 | 14.3 | 59.6 | 73.8 | 14.3 | 59.6 | 73.8 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | 3.1 | 10.4 | 13.5 | |
| West North Central..... | 14.9 | 10.0 | 24.9 | 26.9 | 274.1 | 301.0 | 26.9 | 274.1 | 301.0 | 3.2 | 6.3 | 4.1 | 64.9 | 78.5 | 1.1 | 1.1 | 13.3 | 81.4 | 634.9 | 1,888.9 | 2,598.4 | 1.1 | 1.1 | 13.3 | |
| Minnesota..... | 12.7 | 9.8 | 22.5 | 10.9 | 48.3 | 59.2 | 10.9 | 48.3 | 59.2 | 3.2 | 6.3 | 4.1 | 64.9 | 78.5 | 1.1 | 1.1 | 13.3 | 81.4 | 634.9 | 1,888.9 | 2,598.4 | 1.1 | 1.1 | 13.3 | |
| Iowa..... | 4.1 | 4.1 | 4.1 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| Missouri..... | 2.2 | 2.2 | 2.4 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| North Dakota..... | 2.2 | 2.2 | 2.4 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| South Dakota..... | 2.2 | 2.2 | 2.4 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| Nebraska..... | 2.2 | 2.2 | 2.4 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| Kansas..... | 2.2 | 2.2 | 2.4 | 4.1 | 112.6 | 116.7 | 4.1 | 112.6 | 116.7 | 2.1 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 1.1 | 1.1 | 20.6 | 538.9 | 585.2 | 1,144.6 | 1.1 | 1.1 | 20.6 | |
| South Atlantic..... | 2.5 | 1.8 | 23.4 | 40.9 | 68.7 | 6.6 | 32.2 | 81.7 | 206.6 | 321.1 | 4 | 10.3 | 6.4 | 17.1 | 2 | 9 | 2 | 810.9 | 14.7 | 2 | 9 | 2 | 810.9 | 14.7 | |
| Delaware..... | 4.4 | 4.4 | 4.4 | 4.4 | 17.5 | 21.9 | 4.4 | 17.5 | 21.9 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | |
| Maryland..... | 2.9 | 2.9 | 2.9 | 2.9 | 17.5 | 21.9 | 2.9 | 17.5 | 21.9 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | |
| West Virginia..... | 11.4 | 11.4 | 11.4 | 11.4 | 17.5 | 21.9 | 11.4 | 17.5 | 21.9 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | |

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|-------------------------|------|------|------|-------|-------|-------|-------|------|------|------|-------|-------|---------|---------|-------|-------|-------|---------|
| North Carolina..... | 1.8 | 15.0 | 25.6 | 40.7 | 5.3 | 10.2 | 10.5 | 28.0 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 5.3 | 132.1 | 257.1 | 402.7 |
| South Carolina..... | 2.5 | 5.5 | 1.0 | 8.3 | 6.1 | 3.8 | 15.2 | 25.1 | 0.4 | 0.4 | 0.4 | 0.9 | 1.0 | 1.3 | 11.8 | 325.7 | 383.6 | 730.8 |
| Georgia..... | 2.5 | 5.5 | 1.0 | 8.3 | 6.1 | 3.8 | 15.2 | 25.1 | 0.4 | 0.4 | 0.4 | 0.9 | 1.0 | 1.3 | 11.8 | 325.7 | 383.6 | 730.8 |
| Florida..... | 2.5 | 5.5 | 1.0 | 8.3 | 6.1 | 3.8 | 15.2 | 25.1 | 0.4 | 0.4 | 0.4 | 0.9 | 1.0 | 1.3 | 11.8 | 325.7 | 383.6 | 730.8 |
| East South Central..... | 10.7 | 20.3 | 31.0 | 6.4 | 7.1 | 6.4 | 19.9 | 10.3 | 10.3 | 10.3 | 10.3 | 0.2 | 0.7 | 0.9 | 38.3 | 68.9 | 436.0 | 791.4 |
| Kentucky..... | 10.7 | 20.3 | 31.0 | 6.4 | 7.1 | 6.4 | 19.9 | 10.3 | 10.3 | 10.3 | 10.3 | 0.2 | 0.7 | 0.9 | 38.3 | 68.9 | 436.0 | 791.4 |
| Tennessee..... | 10.7 | 20.3 | 31.0 | 6.4 | 7.1 | 6.4 | 19.9 | 10.3 | 10.3 | 10.3 | 10.3 | 0.2 | 0.7 | 0.9 | 38.3 | 68.9 | 436.0 | 791.4 |
| Alabama..... | 10.7 | 20.3 | 31.0 | 6.4 | 7.1 | 6.4 | 19.9 | 10.3 | 10.3 | 10.3 | 10.3 | 0.2 | 0.7 | 0.9 | 38.3 | 68.9 | 436.0 | 791.4 |
| Mississippi..... | 10.7 | 20.3 | 31.0 | 6.4 | 7.1 | 6.4 | 19.9 | 10.3 | 10.3 | 10.3 | 10.3 | 0.2 | 0.7 | 0.9 | 38.3 | 68.9 | 436.0 | 791.4 |
| West South Central..... | 9.5 | 0.6 | 4.2 | 175.2 | 189.5 | 3.7 | 4.6 | 63.9 | 79.3 | 0.4 | 1.6 | 2.0 | 0.2 | 3.0 | 42.1 | 135.5 | 307.9 | 1,463.4 |
| Arkansas..... | 9.5 | 0.6 | 4.2 | 175.2 | 189.5 | 3.7 | 4.6 | 63.9 | 79.3 | 0.4 | 1.6 | 2.0 | 0.2 | 3.0 | 42.1 | 135.5 | 307.9 | 1,463.4 |
| Louisiana..... | 9.5 | 0.6 | 4.2 | 175.2 | 189.5 | 3.7 | 4.6 | 63.9 | 79.3 | 0.4 | 1.6 | 2.0 | 0.2 | 3.0 | 42.1 | 135.5 | 307.9 | 1,463.4 |
| Oklahoma..... | 9.5 | 0.6 | 4.2 | 175.2 | 189.5 | 3.7 | 4.6 | 63.9 | 79.3 | 0.4 | 1.6 | 2.0 | 0.2 | 3.0 | 42.1 | 135.5 | 307.9 | 1,463.4 |
| Texas..... | 9.5 | 0.6 | 4.2 | 175.2 | 189.5 | 3.7 | 4.6 | 63.9 | 79.3 | 0.4 | 1.6 | 2.0 | 0.2 | 3.0 | 42.1 | 135.5 | 307.9 | 1,463.4 |
| Mountain..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Montana..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Idaho..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Wyoming..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Colorado..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| New Mexico..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Arizona..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Utah..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Nevada..... | 1.5 | 33.1 | 34.5 | 15.9 | 39.0 | 130.6 | 185.5 | 0.4 | 2.3 | 3.7 | 136.3 | 335.1 | 1,432.6 | 1,903.9 | 449.0 | 283.1 | 78.9 | 88.2 |
| Pacific..... | 49.6 | 56.4 | 3.5 | 22.3 | 108.1 | 94.8 | 228.6 | 0.8 | 0.3 | 1.1 | 10.3 | 9.3 | 76.5 | 383.1 | 435.2 | 894.4 | 333.8 | 353.5 |
| Washington..... | 49.6 | 56.4 | 3.5 | 22.3 | 108.1 | 94.8 | 228.6 | 0.8 | 0.3 | 1.1 | 10.3 | 9.3 | 76.5 | 383.1 | 435.2 | 894.4 | 333.8 | 353.5 |
| Oregon..... | 49.6 | 56.4 | 3.5 | 22.3 | 108.1 | 94.8 | 228.6 | 0.8 | 0.3 | 1.1 | 10.3 | 9.3 | 76.5 | 383.1 | 435.2 | 894.4 | 333.8 | 353.5 |
| California..... | 49.6 | 56.4 | 3.5 | 22.3 | 108.1 | 94.8 | 228.6 | 0.8 | 0.3 | 1.1 | 10.3 | 9.3 | 76.5 | 383.1 | 435.2 | 894.4 | 333.8 | 353.5 |

Statement of the mileage of highways completed under the Federal aid act arranged by States, by types, and by fiscal years, June 30, 1922—Continued.

| Geographic divisions and States. | Bituminous concrete. | | | | | Portland cement concrete. | | | | | Brick. | | | | | Bridges. | | | | | Total—all types. | | | | |
|----------------------------------|----------------------|-------------|-------------|-------------|-------------|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------|-------------|-------------|-------------|--|
| | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | 1918 | 1919 | 1920 | 1921 | 1922 | Total. | |
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tal. | |
| Total for all States..... | 6,819.5 | 19,759.1 | 1,386.7 | 7,601.7 | 5,711.7 | 123,849.3 | 32,127.7 | 762.0 | 15,821.8 | 826.8 | 208.6 | 273.0 | 0 | 2 | 9 | 4 | 319.9 | 25.2 | 12,516.0 | 372.9 | 632,900.6 | 9,551.6 | 13,354.7 | | |
| New England..... | 7.4 | 7.5 | 12.5 | 30.7 | 58.2 | 118.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | 11.8 | | |
| Maine..... | 4.7 | 2.1 | 12.5 | 1.0 | 20.3 | 1.4 | 2.0 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | | |
| New Hampshire..... | 2.7 | 1.8 | 12.4 | 16.9 | 2.2 | 33.4 | 37.8 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | | |
| Massachusetts..... | 3.6 | 3.6 | 17.3 | 21.0 | 5.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | | |
| Rhode Island..... | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | | |
| Connecticut..... | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | | |
| Middle Atlantic..... | 26.3 | 33.2 | 59.4 | 2.6 | 3.0 | 111.7 | 395.1 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | 512.4 | | |
| New York..... | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | | |
| New Jersey..... | 26.3 | 30.5 | 56.8 | 2.6 | 3.0 | 72.5 | 274.9 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | 353.0 | | |
| Pennsylvania..... | 9.8 | 16.0 | 53.2 | 79.1 | 3.2 | 40.4 | 110.5 | 906.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | 1,060.7 | | |
| East North Central..... | 9.4 | 5.4 | 37.9 | 52.7 | 33.6 | 127.3 | 160.9 | 12.6 | 14.7 | 3.1 | 112.0 | 142.5 | 0 | 4 | 18.8 | 130.2 | 280.6 | 1,685.5 | 2,115.3 | 12.6 | 24.1 | 92.9 | 351.4 | 481.1 | |
| Ohio..... | 4.7 | 7.3 | 12.0 | 4.9 | 74.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | 79.7 | |
| Indiana..... | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | |
| Illinois..... | 4 | 5.9 | 6.3 | 14.3 | 3.2 | 26.1 | 34.5 | 136.7 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | 200.5 | |
| Michigan..... | 14.9 | 10.0 | 24.9 | 26.9 | 27.1 | 301.0 | 3.2 | 6.3 | 4.1 | 64.9 | 78.5 | 1.1 | 1.1 | 13.3 | 81.4 | 634.9 | 1,883.9 | 2,598.4 | 12.6 | 24.1 | 92.9 | 351.4 | 481.1 | | |
| Wisconsin..... | 12.7 | 9.8 | 22.5 | 10.9 | 48.3 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | |
| West North Central..... | 2.2 | 2 | 2.4 | 7.5 | 40.3 | 47.8 | 9 | 112.6 | 116.7 | 2.1 | 19.1 | 21.2 | 3.4 | 3.5 | 2.1 | 10.0 | 50.5 | 61.6 | 174.2 | 140.0 | 174.2 | 140.0 | 174.2 | 140.0 | |
| Minnesota..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| Iowa..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| Missouri..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| North Dakota..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| South Dakota..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| Nebraska..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| Kansas..... | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | |
| South Atlantic..... | 2.5 | 1.8 | 23.4 | 40.9 | 68.7 | 6 | 32.2 | 81.7 | 206.6 | 321.1 | 410.3 | 6.4 | 17.1 | 2 | 9 | 2.8 | 10.9 | 14.7 | 21.7 | 72.6 | 443.2 | 1,509.2 | 2,046.6 | | |
| Dalhousie..... | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | |
| Virginia..... | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | |
| West Virginia..... | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | |

[illegible]

TOTAL MILEAGE COMPLETED.

Mr. ANDERSON. What is the total mileage?

Mr. MACDONALD. The total mileage of all types completed during the fiscal years 1917 to 1922, inclusive, is 25,844. Of this 13,355 is for projects completed and entirely paid for, 4,362 for projects completed but for which final payments have not been made, and 8,127 which is the equivalent completed mileage of projects under construction. I also submit the following summary of the Federal aid road mileage of all types completed by fiscal years, and of the payments made to the States during these years, with totals to July 1, 1922.

(The statement referred to is as follows:)

Summary of completed Federal aid road mileage and of payments made to States.

| Fiscal year. | Miles completed during year. ¹ | Federal aid paid during year. |
|----------------------------|---|-------------------------------|
| 1917..... | 4.2 | None. |
| 1918..... | 305.8 | \$425,406 |
| 1919..... | 1,388.0 | 2,702,248 |
| 1920..... | 4,979.0 | 19,593,430 |
| 1921..... | 9,781.0 | 55,974,305 |
| 1922..... | 9,386.0 | 88,216,123 |
| Total to July 1, 1922..... | 25,844.0 | 166,911,552 |

¹ Includes projects completed and equivalent completed mileage of projects under construction.

Mr. ANDERSON. Can you tell from the material before you the total mileage of completed highways, the total mileage under construction, and the total mileage under contract upon which construction has not yet been commenced?

Mr. MACDONALD. On October 31, 1922, that being the last statement I have, we had 14,706 miles of road under construction, the total estimated cost of which was \$261,330,000; the Federal aid allotted amounted to \$115,214,000, and those projects under construction were reported as being an average of 59 per cent complete, varying by States from 32 to 83 per cent. The projects which had been completed, but on which final payments had not been made, amounted to 5,129 miles, of which the estimated cost was \$76,151,000, and on which the Federal aid amounted to \$34,172,000. The projects on which construction had been completed and all payments had been made amounted to 16,235 miles, at a total estimated cost of \$283,330,000 and on which the Federal aid amounted to \$120,046,000.

Mr. ANDERSON. What I am trying to get at is how you arrive at this estimate of \$30,000,000 for the next fiscal year. Suppose you tell us what the situation is and what the requirements are and then you can figure out the \$30,000,000 afterwards.

Mr. MACDONALD. Mr. Chairman, I will endeavor to boil this down to a really comprehensible statement. There are two questions involved. One is the necessity for authorizing the apportionment to the States of the \$65,000,000 which have been authorized for appropriation for the fiscal year 1924. The other question relates to the making of an appropriation to apply on the authorization. Briefly the status of the funds is as follows:

Three appropriations for Federal aid road work have been made; the first on July 11, 1916, for \$75,000,000, the second on February 28, 1919, for \$200,000,000, and the third on November 9, 1921, for \$75,000,000, a total of \$350,000,000. From the first two of these appropriations an administration fund of 3 per cent, or \$8,260,000, was authorized by the acts and was deducted, leaving a balance of \$266,750,000, which was apportioned to the States. The act of November 9, 1921, changed the administration percentage from 3 to 2½ per cent. This 2½ per cent of the \$75,000,000 amounted to \$1,875,000 and left \$73,125,000, which was apportioned to the States. So that, of the appropriations made to date, \$339,875,000 have been apportioned to the States and \$10,125,000 retained for the administration expenses of the bureau. As of June 30, 1922, \$166,911,552.18 of the apportioned funds had been paid to the States and \$4,648,338.30 had been spent for administration expenses of the Bureau of Public Roads, leaving on that date a balance in the apportioned appropriations of \$172,963,447.82 and in the administration fund of \$5,476,661.70.

The act of June 19, 1922, made no appropriation. It authorized an appropriation of \$50,000,000 for the fiscal year 1923, \$65,000,000 for 1924, and \$75,000,000 for 1925. It authorized the Secretary to make apportionment for 1923. This act also directed the Secretary to act upon projects submitted against the 1923 apportionment and stated that "his approval of any such project shall be deemed a contractual obligation of the Federal Government for the payment of its proportional contribution thereto."

Contractual obligations of the sort referred to in the preceding paragraph have already been entered into with many of the States, and with the exhaustion of the appropriated funds apportioned to these States there will be no funds to pay vouchers rendered by them on account of construction work done under the terms of these contractual obligations.

It would appear at first thought that the apportioned balance of nearly \$173,000,000 shown above should be sufficient to make payments to the States for a considerable period. However, the cash balances to the credit of the individual States are not in such amounts as to permit this, the laggard States having relatively large balances and other States which have been more active in road building having small balances. Under the law, as interpreted by the solicitor of the department, the balances not immediately needed in some States may not be used in other States. For example, let us take the States of Arkansas, Georgia, Idaho, Illinois, Iowa, Maine, Maryland, Minnesota, North Carolina, Oregon, Pennsylvania, and West Virginia. On July 1, 1922, Idaho had a cash balance to her credit of \$1,153,000 and had completed work unvouchered to the amount of about \$115,000, which if paid would reduce her balance as of that date to a little over \$1,000,000. During the fiscal year 1922 she was paid in round numbers \$1,600,000 from the Federal Treasury. If during 1923 the State does a similar amount of work we shall lack over \$500,000, or about 80 per cent of her 1923 apportionment, of having enough to pay her or a larger amount if the unvouchered amount is reduced. In Iowa this is 100 per cent. In like manner we shall have insufficient funds to pay Illinois, Maryland, Minnesota, Oregon, and the other States mentioned, and in order to pay durir

the fiscal year 1923 the States in a position to render vouchers for practically the full amount of their 1923 apportionment we need an immediate appropriation for all the States of the \$50,000,000 authorized for 1923; although in the States of Alabama, Indiana, and Missouri alone we had a total balance on July 1st of nearly \$21,000,000, a balance which judging by our records of the past will not be entirely used in these States until some time during the fiscal year 1926, and under the law as interpreted none of this balance can be used in any of the other States. I have here a blue print showing the condition in each of the States which I would like to insert in the record.

| State. | Unexpended balance of appropriation July 1, 1922. | Unvouch-ered bal-ance Fed-eral aid earned. | Net balance. | Paid during fiscal year 1922. (Esti-mated as same for 1923.) | Estimated net balance July 1, 1923. |
|---------------------|---|--|--------------|--|-------------------------------------|
| Alabama..... | \$5,206,000 | \$498,523 | \$4,807,477 | \$671,347 | \$4,136,130 |
| Arizona..... | 2,118,000 | 205,245 | 1,912,755 | 1,565,578 | 347,177 |
| Arkansas..... | 2,582,000 | 507,975 | 2,074,025 | 2,235,459 | -161,434 |
| California..... | 6,990,000 | 1,883,008 | 5,126,992 | 1,972,801 | 3,154,191 |
| Colorado..... | 3,441,000 | 563,596 | 2,877,404 | 1,344,894 | 1,532,510 |
| Connecticut..... | 1,360,000 | 110,814 | 1,249,186 | 641,175 | 608,011 |
| Delaware..... | 352,000 | 507 | 351,493 | 130,182 | 221,311 |
| Florida..... | 3,227,000 | 710,313 | 2,516,687 | 363,210 | 2,153,477 |
| Georgia..... | 2,727,000 | 255,843 | 2,471,157 | 2,623,896 | -152,739 |
| Idaho..... | 1,153,000 | 115,824 | 1,037,176 | 1,561,531 | -524,355 |
| Illinois..... | 4,177,000 | 230,361 | 3,946,639 | 4,199,325 | -252,686 |
| Indiana..... | 6,928,000 | 1,382,914 | 5,545,086 | 1,467,820 | 4,077,266 |
| Iowa..... | 4,437,000 | 2,040,093 | 2,396,907 | 3,927,803 | -1,530,896 |
| Kansas..... | 5,400,000 | 1,193,228 | 4,206,772 | 2,926,702 | 1,280,070 |
| Kentucky..... | 3,948,000 | 753,593 | 3,194,407 | 1,699,804 | 1,554,603 |
| Louisiana..... | 1,656,000 | 444,169 | 1,211,831 | 1,120,328 | 91,503 |
| Maine..... | 1,480,000 | 435,556 | 1,044,444 | 1,359,434 | -314,990 |
| Maryland..... | 753,000 | 94,623 | 658,377 | 800,408 | -142,031 |
| Massachusetts..... | 3,082,000 | 613,748 | 2,468,252 | 1,113,715 | 1,354,537 |
| Michigan..... | 5,734,000 | 573,207 | 5,160,793 | 3,013,677 | 2,147,116 |
| Minnesota..... | 2,776,000 | 291,787 | 2,484,213 | 2,768,835 | -284,622 |
| Mississippi..... | 3,462,000 | 609,823 | 2,852,177 | 1,791,942 | 1,060,235 |
| Missouri..... | 8,542,000 | 410,219 | 8,131,781 | 2,453,844 | 5,677,937 |
| Montana..... | 3,632,000 | 148,532 | 3,483,468 | 1,607,045 | 1,876,423 |
| Nebraska..... | 4,083,000 | 1,144,584 | 2,938,416 | 1,252,548 | 1,685,868 |
| Nevada..... | 3,222,000 | 322,820 | 2,899,180 | 462,136 | 2,437,044 |
| New Hampshire..... | 493,000 | 58,568 | 434,432 | 234,331 | 200,101 |
| New Jersey..... | 2,743,000 | 385,418 | 2,357,582 | 608,151 | 1,749,431 |
| New Mexico..... | 3,365,000 | 431,378 | 2,933,622 | 1,121,910 | 1,811,712 |
| New York..... | 13,982,000 | 1,143,475 | 12,838,525 | 3,105,032 | 9,733,493 |
| North Carolina..... | 2,672,000 | 652,716 | 2,019,284 | 2,264,343 | -245,059 |
| North Dakota..... | 2,707,000 | 296,329 | 2,410,671 | 1,830,060 | 580,611 |
| Ohio..... | 5,991,000 | 351,891 | 5,639,109 | 4,219,322 | 1,419,787 |
| Oklahoma..... | 4,540,000 | 413,963 | 4,126,037 | 2,819,836 | 1,306,201 |
| Oregon..... | 1,265,000 | 8,983 | 1,256,017 | 1,778,932 | -522,795 |
| Pennsylvania..... | 4,787,000 | 1,140,308 | 3,646,692 | 5,292,767 | -1,646,075 |
| Rhode Island..... | 431,000 | 13,526 | 417,474 | 310,803 | 106,671 |
| South Carolina..... | 2,329,000 | 391,907 | 1,937,093 | 1,431,877 | 505,216 |
| South Dakota..... | 3,083,000 | 434,886 | 2,648,114 | 1,670,116 | 977,998 |
| Tennessee..... | 5,119,000 | 990,104 | 4,128,896 | 2,301,446 | 1,827,450 |
| Texas..... | 10,888,000 | 2,448,582 | 8,439,418 | 5,915,046 | 2,524,372 |
| Utah..... | 2,831,000 | 538,851 | 2,292,149 | 651,613 | 1,640,536 |
| Vermont..... | 1,043,000 | 128,645 | 913,355 | 380,700 | 532,655 |
| Virginia..... | 3,585,000 | 558,337 | 3,026,663 | 1,973,642 | 1,053,021 |
| Washington..... | 1,146,000 | 123,860 | 1,022,140 | 536,343 | 485,797 |
| West Virginia..... | 1,284,000 | 415,453 | 877,547 | 1,016,870 | -139,323 |
| Wisconsin..... | 3,934,000 | 648,720 | 3,285,280 | 3,119,215 | 166,065 |
| Wyoming..... | 2,164,000 | 550,898 | 1,613,102 | 618,328 | 994,774 |
| Total..... | 172,959,000 | 27,648,583 | 145,310,417 | 88,216,122 | 63,011,300 |

For the fiscal year 1924 conditions similar to the above will render necessary an appropriation of the full amount of the 1924 fiscal year authorization for payment of vouchers during the fiscal year 1924, assuming that Congress, in the meantime, authorizes the apportionment of the 1924 amount already authorized by it to be appro-

priated. The \$30,000,000 proposed to be appropriated under the bill now under consideration should enable the payment of vouchers submitted up to January 1, 1924, provided the \$50,000,000 for 1923 is subsequently appropriated.

Relative to the question of authorization for the apportionment of the \$65,000,000 authorized to be appropriated for the fiscal year 1924, if it may be stated that on July 1, 1922, of the \$388,625,000, the total apportionment to date (which includes \$48,750,000 for 1923 apportioned but not yet appropriated), \$91,606,079 remained unobligated.

During the fiscal year 1920 \$109,127,000 in Federal funds were obligated to the States, during 1921 \$84,115,000, and during the fiscal year 1922, \$49,000,000. Had not progress been repressed during 1921 by the approaching exhaustion of apportioned funds the obligation during that year would undoubtedly have passed \$100,000,000. Again during the fiscal year 1922 it is estimated that Federal aid road work was repressed to the extent of approximately \$50,000,000 because of lack of a congressional appropriation to continue the work at the same rate as in 1920 and 1921. This is indicated quite plainly in the chart which I have here showing "Progress of Federal aid road work."

The best evidence we have indicates that the States would normally easily absorb approximately \$100,000,000 a year in Federal aid with a yearly appropriation of this amount and at the rate at which funds have been obligated in the past the funds now apportioned will all be obligated, averaging all the States, considerably before the end of the present fiscal year. Any delay there may be in authorizing the apportionment of the 1924 funds will act as a repressive influence. On October 31 of this year the States of Maryland, Washington, and Oregon had obligated practically all their apportioned funds and must await further apportionments before they can proceed with their normal Federal aid road program. The chart also shows conclusively that construction parallels obligation at an average interval of approximately six months which is the time taken in the survey and preparation of plans and estimates.

As an explanation of the term obligated which I have used I will state that the initiatory step for the improvement of a Federal aid road project is by the State in the submittal of a project statement wherein is adequately described the location, nature, and expected cost of the improvement proposed. This statement is submitted through the appropriate district office of the bureau and from the district office after proper field and office inspection and examination, it is forwarded to bureau headquarters in Washington, where after further scrutiny it is transmitted to the Secretary of Agriculture for action. If favorable action is taken by the Secretary notice of it is sent to the State highway department and upon such favorable action it is considered that the Federal Government is obligated to the extent of the amount of Federal aid stated in the approved project statement. The aggregate of these approved statements in a State, as modified by any amendments there may be made as the work proceeds, constitute the aggregate of obligations against a State's apportionment and when the total of the obligations reach the total of the apportionment the normal progress of the State's Federal aid road activities is of course interrupted until a new appor-

tionment is made. This interruption means a serious disturbance in the organizations of the State highway departments; a reduction in force and dismissal of trained men who may not be available when the program is resumed.

STATE REQUIREMENTS.

Mr. ANDERSON. Is there any way of knowing whether any one particular State expects to put on an average program or more or less than that?

Mr. MACDONALD. Yes, sir; we obtain estimates from the States as to their requirements and as to the program which they expect to put under way. While we secure these estimates from them, we are governed to a large extent by our own records of what has been done in the past. We maintain for each State a curve similar to the chart I have shown for all of the States combined, which shows the progress at which their work is put under way and completed, and by extending those curves which show a rather constant performance, State by State, we are able to arrive at approximately what we think a State will do in the way of putting funds under construction for the succeeding year. We are willing, of course, to admit that one State, or two or three States, may rise above the line of the curve by making an unusual effort to put a large amount of work under way, but the 48 States are so balanced in that respect that we find our figures are quite dependable. By running out the curve on the 48 States, and making a composite of the whole, we believe that we have a very accurate forecast of what we will need from the standpoint of total funds for the succeeding year, and, in fact, we have projected what we believe the total program will be for the next two years. We have done that from a careful study of the curves of past performance.

Our conclusions as stated above are that there should be an immediate appropriation of the \$50,000,000 authorized for 1923, an immediate authorization to apportion the \$65,000,000 authorized to be appropriated for the fiscal year 1924, and an immediate appropriation of \$30,000,000 from the \$65,000,000 authorization to be followed by an appropriation of the balance of the authorization by January 1, 1924. This program, however, will not enable the States to proceed on so extensive a road-building program as they have been carrying during the last three fiscal years.

Mr. ANDERSON. Even with the \$30,000,000 appropriated?

Mr. MACDONALD. With the entire \$65,000,000 appropriated, there would not be a sufficient amount to pay the States the sums that we paid them during the past fiscal year. That is, there is no question but what a number of States, proceeding as in the past, will need to draw their proportion of the entire \$65,000,000.

Mr. ANDERSON. The question seems to be whether we are to leave in the Treasury a considerable sum of money which is not drawn by some of the States, while there may be a deficit in the amount which will be drawn by others.

Mr. MACDONALD. That, of course, would automatically take care of itself at the end of each three-year period. That is to say, Congress has fixed a three-year period during which States can take up each appropriation. I myself think that is rather too long a period, and I opposed that length of time when the legislation was proposed. I do not know why it was fixed at three years. States which do not take

up their funds with reasonable promptness cause Congress to believe that there are available funds for carrying on a program generally all over the United States, while, as a matter of fact, those balances are actually available for the most part within a very few States.

Mr. BUCHANAN. Let me see if I understand you: Congress has adopted a three-year period as the average, and the States can take their proportion of the money appropriated within that period of time?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. We will say that five States during the first year fail to take up \$1,000,000 of their respective allotments for that year: Then there will accumulate in the Treasury for the first year \$5,000,000, for the second year \$5,000,000, and for the third year \$5,000,000, making at the end of the three-year period \$15,000,000 that would revert to the Treasury, if the States failed to take up those amounts during that three-year period. Is that true?

Mr. MACDONALD. No, sir.

Mr. BUCHANAN. Then what would become of that money? We will say that five States fail to take up \$1,000,000 each of their allotments for the three-year period, and I want to know what becomes of that \$15,000,000.

Mr. MACDONALD. At the end of the three-year period, the first \$5,000,000 would go back into the Treasury, and be reapportioned among the States that had gone ahead. It would be lost for that individual State, but not lost to the total fund.

Mr. BUCHANAN. Then the \$5,000,000 would remain in the Treasury for three years?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. Before it would be allotted to the other States?

Mr. MACDONALD. Yes, sir. Then the next \$5,000,000 would be available for the next three-year period.

Mr. BUCHANAN. Then it would be reallocated at the end of the fourth year?

Mr. MACDONALD. Yes, sir.

Mr. BUCHANAN. And the last \$5,000,000 would be reallocated at the end of five years to the other States that took their appropriations?

STATES TAKE UP ALLOTMENT BEFORE THREE-YEAR LIMIT EXPIRES.

Mr. MACDONALD. Yes, sir. What actually happens is that the States can be three years behind, but if they put in their project agreements and have their contracts signed up by the end of the fiscal year during which that particular allotment would lapse, they can continually hold on to their funds. They can work two years behind the average, and still hold their funds. There have been no funds to lapse for any State yet, and I do not think there will be, because all of them are proceeding at a sufficient rate to come within the three-year limit.

Mr. BUCHANAN. The provision requiring that procedure is embodied in the law?

Mr. MACDONALD. Yes, sir. Taking the balance which we should have in the Treasury at the end of this fiscal year, and assuming that all the States draw all of the Federal aid that they have earned, and we think they will earn as much as they did last year, we would

have a total of \$63,000,000, but here is Alabama with \$4,000,000, California with \$3,000,000, Indiana with \$4,000,000, and New York with \$9,000,000, or pretty nearly half of the funds in those four or five States, the rest of it being distributed in small balances. These balances are based upon the assumption that the payments during 1923 will be the same as for 1922.

Mr. ANDERSON. They will not do that, because your authorization for this year is not as large.

Mr. MACDONALD. The authorization for this year does not have anything to do with what the States are going to draw. Of course, it has something to do with it, but a large part of the program for which they actually pay out the money is based on former apportionments, and out of the apportionment that will be available for this year of \$50,000,000, I assume that probably \$26,000,000 will go over for the program next year.

Approximately, we estimate that there are 20 States that will need their apportionments of the \$65,000,000 during the fiscal year 1924. Those estimates are as close as can be made without knowing whether the States will take up the entire amount of our indebtedness to them, or whether they will carry on the same-sized program as they have on an average during the preceding years. If all the States were operating on the same basis, then any balance which we have remaining in the Treasury would all the time be prorated to the States in the same proportion as the funds are originally appropriated, and then the total balance would mean something, but as it is, the total balance means nothing whatever.

Mr. ANDERSON. You are dealing with two things here?

Mr. MACDONALD. Yes, sir; that is true.

Mr. ANDERSON. One of them is the authorization. Now, it seems to me that you have language here which continues your authorization, but so far as this committee is concerned, we have nothing to do with that except as the authorization creates an obligation which has to be paid out of the Treasury this year. What we want to get at, if we can, is this, I think: Assuming that this authorization will be made in accordance with the provisions of this section of the law, what additional sums will be drawn from the Treasury in addition to those already appropriated, and those which must be appropriated for this year?

Mr. MACDONALD. It is this fiscal year that we are talking about.

Mr. ANDERSON. I mean the next fiscal year.

Mr. MACDONALD. Assuming that that authorization would carry sufficient authority over into the succeeding fiscal year, or that the Appropriations Committee could appropriate the balance of it. I believe that the \$30,000,000 would be sufficient until January 1, 1924, but I can not guarantee that it would be.

Mr. ANDERSON. Of course, that is not a matter of very great consequence, perhaps, because the next session will be next December. If we do not have one earlier, and, as long as you can create obligations, the mere appropriation of the money is relatively a small thing.

Mr. MACDONALD. I agree with you thoroughly on that. However, to get some safeguard, if it were specified by the committee that the \$30,000,000 could be used to take up obligations as they came in. it would be well.

Mr. ANDERSON. Let me ask you the question that I asked Mr. Jump a while ago, which question did not go into the record, but which, perhaps, will clarify the situation. The question I want to ask is this: Suppose there is authorized to be expended \$65,000,000 for the next fiscal year, and you apportion that to the States, thereby creating an obligation on the Treasury for its payment, and suppose we appropriate \$30,000,000 as being the sum which will be actually withdrawn from the Treasury as a consequence of those obligations; now, must that \$30,000,000 be apportioned in the same ratio as the original \$65,000,000 was apportioned, or can that \$30,000,000 be drawn upon in the proportion in which the States have actually done their work?

Mr. MACDONALD. Well, I would judge that under our present procedure we would only pay out in proportion.

Mr. ANDERSON. There is this distinction between what you have been doing heretofore and what you are doing now: Heretofore you have had the actual money appropriated.

Mr. MACDONALD. Yes, sir.

Mr. ANDERSON. Consequently, there was no distinction between the appropriation and the authorization, but it was all one thing. If you did not spend it in one year, you could take it up in the next. Now, we have made a change in that situation somewhat, and we have made an authorization upon which you can create obligations. The question which arises seems to be perfectly simple. If you take the money out of the Treasury in the ratio in which you have made the allotments to the States, then you are going to have a certain amount of money in the Treasury that lies there obligated until it is expended. In the other case, you have States that will have money coming to them that you will not be able to pay, although it was allotted to them under the authorization, because you have not the cash. The question is whether this \$30,000,000 can be allotted as a fund out of which you can pay obligations that arise this year, without respect to the allotments created under that authorization. If you can, it will take much less money than would be required the other way.

Mr. MACDONALD. My own judgment is that that is the way it should be handled, and I know of nothing that would prevent your putting language into the law that would allow that procedure.

Mr. BUCHANAN. How about the law on the books now or the regulations of the department? Can you not do that now? Suppose we gave you \$30,000,000 in the way the bill reads, and suppose some States enter into contracts and complete them, while some other States do not. Could you not take all of this money and pay the obligations of States that did complete their contracts, leaving the others that did not complete them obligated under the balance of the \$65,000,000? Does the law provide that the cash appropriation shall be allotted in accordance with the original allotment of the \$65,000,000?

Mr. MACDONALD. I think that it would be rather better to make it clear in the law, if possible.

Mr. BUCHANAN. This is not a legislative committee.

Mr. MACDONALD. I think the Secretary should have authority within his discretion to so use the appropriation.

Mr. ANDERSON. It seems to me that it gets down to a fairly simple proposition. We have authorized \$65,000,000, and we must pay

that some time, but we are only going to pay \$30,000,000 of it this year. It is not quite as simple as that, because you have some hang-overs, but that is what it amounts to in the aggregate, is it not?

Mr. MACDONALD. Yes, sir; I believe that it would be possible to provide for the use of the fund in that way. The total \$65,000,000 to be apportioned, and \$30,000,000 appropriated to apply to all of that apportionment as the obligations come in.

Mr. ANDERSON. Yes, that is the proposition.

Mr. MACDONALD. I suppose there is no possibility of getting any assurance that Congress would act promptly when we had expended the \$30,000,000.

Mr. ANDERSON. I assume, and I think it is a perfectly sound assumption, that Congress, having authorized the Secretary of Agriculture to incur certain obligations which mature in the future, and Congress having appropriated in its best judgment and in your best judgment the amount which would be required for this fiscal year under that authorization, if the developments were such that a larger amount was required, it would recognize that clearly as a deficiency under our rules. If your department were to spend more than \$30,000,000 during the next fiscal year upon that authorization already made, it seems to me perfectly clear that that would be a deficiency.

Mr. MACDONALD. Assuming that that plan could be carried out, I think it would be preferable to piling up the appropriation.

Mr. ANDERSON. There is no use in appropriating \$65,000,000 or \$50,000,000 for the next fiscal year if your actual obligations will call for only \$30,000,000 or \$35,000,000.

Mr. MACDONALD. I agree with you and with the Director of the Budget on that.

Mr. ANDERSON. I suggest that you put some of those tables in the record, so we will have complete data before us.

Mr. MACDONALD. I will do so.

PROVISION FOR OBLIGATION OF BALANCE OF AUTHORIZATION.

Mr. BUCHANAN. You have a provision here in this bill which provides for the obligating of the balance of the \$65,000,000 that we are authorized to appropriate. Now, that \$65,000,000 has been allotted in a certain proportion to the different States. What reason have you to believe that all of those States will be ready to enter into obligations such as would continue the power of Congress to appropriate under the original authorization? Some of them may not be ready within the fiscal year, and, that being the case, we would lose the power to appropriate under that original authorization the \$65,000,000—that is, if some States were not ready to enter into obligatory contracts within the fiscal year.

Mr. MACDONALD. It is my understanding of the language of this act that it changes that status in that we are authorized to enter into contractual obligations.

Mr. BUCHANAN. The proviso reads:

Provided further, That the Secretary of Agriculture shall act upon projects submitted to him under his apportionment of this authorization, and his approval of any such project shall be deemed a contractual obligation of the Federal Government for the payment of its proportional contribution thereto.

So that the States, or all the States, will have to be prepared and ready to submit to the Secretary of Agriculture a proposition for the improvement of public highways, and you must be ready to do it within this fiscal year in order to hold our authority to appropriate the rest of the \$65,000,000.

Mr. MACDONALD. In order to be able to answer that question correctly, I would have to know if that is the viewpoint of this committee toward such an authorization. I was going on the theory that if the \$65,000,000 is apportioned as the authority would be given under this act, and a considerable portion of the States will actually place their full apportionments, or their full share of the apportionment, under contract, and that the Secretary approves their projects, or if, say, half of the States did that within the fiscal year, then the remainder of the \$65,000,000 must be appropriated either during the fiscal year or during the following fiscal year, or else we break faith with the balance of the States.

Mr. BUCHANAN. That is true; it must be either during the fiscal year or the following fiscal year, but suppose it is not obligated during the fiscal year, will Congress then have the power to appropriate under that original act authorizing \$65,000,000 for this fiscal year?

Mr. MACDONALD. I am assuming that Congress will have, having authorized the Secretary to enter into contractual obligations.

Mr. BUCHANAN. They must actually enter into contracts.

Mr. ANDERSON. But not within the fiscal year, necessarily.

Mr. BUCHANAN. You may be right about that.

Mr. JUMP. This morning Mr. MacDonald and I raised that question with General Lord, and he called in Judge Warwick, the former Comptroller of the United States, who is now a member of the Budget staff. While it was recognized that the question was solely one pertaining to the rules of the House, concerning which the executive officers of the Government are not authorized or competent to rule, the opinion of Judge Warwick, informally expressed to us, of course, was that this proviso in the estimates about the \$65,000,000 apportionment and subsequent obligations to be entered into under it would perpetuate the authority to report out appropriations in later fiscal years, whereas the original act, as we understand your view of it, might not do it.

Mr. ANDERSON. Entirely aside from the question of the time it is obligated, my impression is that where Congress has authorized the Government to enter into an obligation, and that obligation has been entered into as a fixed continuing work, under our rules no question would arise under this provision at all. I do not think any question would arise under it at all.

Mr. JUMP. In other words, it does not seem that Congress would authorize the Secretary of Agriculture immediately upon the passage of this act to apportion the full authorization of \$65,000,000 among the States and then do other than honor the obligation, regardless of whether the fiscal year had expired or not.

Mr. BUCHANAN. I do not know what would be the construction of this language, but I do not believe that this provision extends one iota the power of Congress to appropriate under this authorization unless the projects have been approved within the time that Congress authorizes the making of the appropriation.

Mr. JUMP. That is the whole question.

Mr. BUCHANAN. We can not authorize a department to enter into a contract after the time has elapsed when we are authorized to make the appropriation.

Mr. JUMP. Do you not think you have extended the time?

Mr. BUCHANAN. If he approves the project, he can extend it to eternity—that is, if he approves the project during the time that we are authorized to appropriate.

Mr. JUMP. If there is any doubt, why not put in an additional sentence specifically extending the time of the authorization?

Mr. BUCHANAN. Possibly it should be extended for the three-year period.

Mr. MACDONALD. We have a general law providing that funds apportioned under the federal highway act are available for three years.

Mr. Chairman, the other day we had a hearing or a partial hearing, on that provision of the law authorizing us to exchange passenger vehicles, and I am prepared to insert the figures, or to go into that question, if you desire it.

Mr. ANDERSON. I do not think that will be necessary.

Mr. MACDONALD. I find that it will be necessary for us to have for the next year or two, and, perhaps, longer, in the neighborhood of \$29,000 to replace cars, or authority to use up to that amount. This is in addition to the amounts now shown in the bill. We have 175 cars in use.

Mr. ANDERSON. I suggest that you have the solicitor or somebody draw up a provision authorizing you to use that amount out of some appropriation.

Mr. MACDONALD. I will do so.

MONDAY, NOVEMBER 27, 1922.

BUREAU OF AGRICULTURAL ECONOMICS.

STATEMENTS OF DR. H. C. TAYLOR, CHIEF; MR. LLOYD S. TENNY, ASSISTANT CHIEF; MR. WILLIAM A. SCHOENFELD, DIRECTOR OF MARKETING RESEARCH; MR. WELLS A. SHERMAN, SPECIALIST IN MARKET SURVEYS; MR. W. F. CALLANDER, IN CHARGE OF DIVISION OF CROP AND LIVESTOCK ESTIMATES; MR. J. CLYDE MARQUIS, DIRECTOR OF MARKET INFORMATION; MR. H. S. YOHE, IN CHARGE OF ADMINISTRATION OF UNITED STATES WAREHOUSE ACT; MR. C. W. KITCHEN, SUPERINTENDENT OF CENTER MARKET, AND MISS EMILY E. CLARK, JUNIOR ASSISTANT IN MARKET INFORMATION.

GENERAL CHARACTER.

Doctor TAYLOR. Mr. Chairman, the Bureau of Agricultural Economics comprises the elements of the old Bureau of Markets, the Bureau of Crop Estimates, and the Office of Farm Management and Farm Economics, which have been consolidated into one bureau. This work of consolidation has been going on for about a year and a half in accordance with the authority in the appropriation

bills for 1922 and 1923. As indicated in the statements of last year, the first consolidation, that of the Bureau of Markets and the Bureau of Crop Estimates, made possible the throwing together of a part of the administrative sections last year, that is, of mail and files, accounts, library, etc., which altogether made possible a saving of about \$30,000 in the general expense of operation. Then, when the Office of Farm Management and Farm Economics was consolidated with the Bureau of Markets and Crop Estimates, a similar saving was made through the further consolidation of those service units of Farm Management and Farm Economics with the larger organization; so that there has been a saving in the general overhead by those two steps in consolidation of approximately \$60,000. A part of this was taken out of the statutory roll and a part of the saving was effected by transferring certain employees who had participated in the general administration of the bureaus to scientific work.

CONSOLIDATION OF BUREAUS.

More important, however, than the financial savings is the increased efficiency or effectiveness of the marketing work of the department through this consolidation. There are three ways, at least, in which this consolidation has increased the effectiveness of the work. In the first place, that has been done by bringing together the working units of Crop Estimates and Farm Management. For example, the crop estimating machinery of the old Bureau of Crop Estimates has proved exceedingly useful to those who are working on farm-management problems by providing a means of gathering some general information to supplement the detailed information that was being gathered directly from the farmers by those working on the problem of cost production and farm organization. Detailed cost accounting work has been carried on on a large number of farms in different parts of the United States for the purpose of securing the basic elements of cost in terms of the materials and labor entering into the cost of producing crops. Those figures become of greater permanent value when supplemented from year to year by specific information that can be gotten through crop estimators with regard to the changes that have taken place in the cost of those material elements of cost—that is, changes in the cost of labor in the production of wheat, and of supplies, such as binding twine, etc., that may change from year to year. Another example of the benefits derived from this closer coordination may be illustrated by the work in live-stock estimates and live-stock marketing.

By bringing the live-stock marketing section in close conjunction with the live-stock estimating section, they have proved to be mutually helpful, and are cooperating very closely, so that the information that is secured in Chicago, for instance, by the live-stock marketing division supplements material that is collected in the field by the live-stock estimating group in making a determination of what has actually taken place; that is, what comes into the market is a check upon estimates of what was behind the market. Furthermore, the materials that are gotten through crop estimates with regard to what is probably behind the market this year is very helpful to those who are interested in that problem from the marketing point of view, and who are interested in knowing what is coming into the market during a given season.

Another way in which the consolidation has proved especially helpful is by bringing together the people working on the economics of production and the economics of marketing and talking over the various problems that they jointly have to work upon, each gets the point of view of production and of marketing, and not simply the point of view of production or the point of view of marketing. We come to see more and more that many of the problems of marketing arise out of conditions in the field of production and, on the other hand, many of the questions that the farmer needs to have answered before deciding what to produce have to be answered by those who are working in the field of marketing. The biggest change that has been brought about in the work of the combined bureaus and, particularly, with regard to the marketing work, is the introduction of more economic research.

More effort is being given to the thorough understanding of the economic forces that influence the market movement of farm crops. A study is being made of what happens to each of the principal crops from the time it leaves the farm until it reaches the consumer. For example, take wheat: We are interested in making a study of what happens to wheat at the local station as the farmer and the local buyer get together and agree upon a price at which the wheat shall be sold, and the extent to which careful grading of the grain is taking place. Then, we are interested in the financing as well as the actual movement of the grain, both in the local and in the central markets, following through in detail everything that happens to this wheat, including the financing and the grading of the wheat, from the time it leaves the farm until it reaches the mill, with a view to making a clear picture that will be a basis, first, for educational work, and second, for a proper adjustment of our grain grades, in order that through a proper adjustment of grain grades and through the education of the farmer to look after his own interests, the milling value of the wheat may be more perfectly reflected back to the farm. An example of one thing that has received a great deal of attention is the "Know your wheat" campaign, which has for its purpose teaching the farmer to know what he has to sell in order that he may sell it more advantageously. It has the further office, however, of stimulating him to produce a thing that is of higher intrinsic value in the market. Work along this same line is being carried on in the field of cotton marketing. In the past it was the rule for cotton of different grades and staple to be sold, by the smaller farmers in particular, at the average price in a given community without regard to the differences in value.

Educational work has been carried on jointly with the extension services in the various States, to help the farmers to know the value of what they are producing, and, in turn, that has had a very beneficial influence upon the farmers in selecting varieties of cotton to grow that will demand better prices. We hope to organize the research work in such a way as to form the foundation for improving all of the services and the regulatory work. In a general way, Mr. Chairman, the effort has been to make the research work of the bureau follow up and actually further the work that was so well begun in the field of marketing and credit by the Joint Commission of Agricultural Inquiry.

STUDIES MADE BY FEDERAL TRADE COMMISSION.

Mr. ANDERSON. To what extent are you able to make use of the studies made by the Federal Trade Commission?

Doctor TAYLOR. In each of the investigations that we make, for instance, in the marketing of wheat, we get together the hearings before the Federal Trade Commission, and use that material in so far as it answers the question that needs to be answered. Take, for example, the question of the extent to which grain is actually sold by grade at the local stations. We find information there, but we feel disposed to ask certain questions with regard to that information.

When the statement is made in one of those hearings that grain is generally purchased on the basis of United States standards, we want to know what actually transpires at the local stations—whether all of the necessary work is performed to ascertain accurately what the grade is, or whether they roughly determine it as U. S. No. 1 or U. S. No. 2. Our impression is that, while it is quite generally bought on the basis of those grades, in many instances the grades are not by any means accurately determined at the local stations.

Another way in which the work is benefited by the consolidation is through our publications and out news services. By consolidating the news or information services of those three bureaus into one, and keeping the farmers informed about the economic problems of both production and marketing all the time, we are able to make the work more effective. It is true that it is very often not production news so much as marketing news that the producer is interested in, because he is adjusting his production to market conditions. Furthermore, it is often true that it is not so much what is happening in the market that the market man is interested in, as in what is happening behind the market in production, and we are keeping the whole field of marketing and production before our minds in sending out information. We believe it is more effective than where those who are interested primarily in production are giving out information for the producer and where those who are interested in marketing are giving out information for those who are interested in the handling of farm produce.

With this general statement, I would like to pass on to the specific items of appropriation.

SALARIES.

Mr. ANDERSON. Suppose we take up the statutory roll on page 269?

Doctor TAYLOR. I would like to have Miss Clark cover the statutory roll.

Miss CLARK. We have \$965,440 on the statutory roll now. There is an apparent increase on this item of \$11,990, but an actual decrease of \$30,260. The apparent increase is caused by the transfer of 40 employees, with salaries aggregating \$48,700, from the lump-sum roll to the statutory roll, and the transfer of one accountant and bookkeeper from the office of the Secretary to this bureau.

Mr. ANDERSON. Where did those transfers come from?

Miss CLARK. They came from various lump-sum rolls of our bureau, and I have a second table here covering that. The transfers were as follows: From farm management and practice, \$9,720; from market distribution and farm production, \$10,780; from crop and

live-stock estimates, \$18,000; from market news service, \$3,600; from enforcement of the United States cotton futures act, \$3,000; and from the administration of the United States warehouse act, \$3,600.

Mr. ANDERSON. What I want to get at is how those places arose under those lump sums?

Miss CLARK. Those places are new appointments made since the last transfers to the statutory roll, but they are very largely offset by the places we are dropping. They are offset, first, by the transfer of one executive clerk at \$2,250 and one telegraph operator at \$1,400 to the office of the Secretary. Four clerks of class 1 are being transferred to the Bureau of Plant Industry, which were omitted accidentally last year. Then there are dropped from the roll 45 places with salaries aggregating \$30,260. All of those places are either vacant or are filled by employees whose services can be dispensed with by the end of the present fiscal year.

Mr. ANDERSON. What I am getting at is this: You set up a situation last year which made the statutory roll and the roll under the lump sum. The supposition at that time, I assume, was that the statutory roll that was then set up was set up with reference to the clerical requirements in connection with those lump sums. Of course, if that assumption is not correct, we must come to a different conclusion. If it is correct, what I want to know is where the occasion for those clerks arose. In other words, if the statutory roll, when you got those appropriations, was properly apportioned to your lump sums, there would have been no occasion for appointing new clerks to be paid out of the lump sums.

Miss CLARK. We increase the statutory roll only by transfers from the lump sums—that is, by the transfer from the lump sums of clerks who are already in the bureau.

Mr. ANDERSON. I understand that, but that is a continuous process, apparently.

Miss CLARK. It is a continuous process. This looks like more of an increase however than it is. There is a net increase of only \$11,990, and we are dropping more places than we are creating new ones. There are 45 places that will be dropped, and only 40 new places to be created. That makes this readjustment necessary.

Mr. ANDERSON. What was the total increase in the Bureau last year, exclusive of the statutory roll? Do you recall?

Miss CLARK. The total increase to the bureau was approximately \$136,000, and of that just about \$36,000 was on the statutory roll. There is a need for readjustment as the clerical roll is constantly changing. We lost nearly 25 per cent of our total clerical roll by terminations, through resignations, and otherwise, and we have had new appointments. For that reason we have difficulty in keeping the clerical force adjusted to the statutory roll. Every year there are apt to be some new transfers. When there is an increase in the appropriations, it has not been the custom to ask for new statutory places. It has been the policy not to ask for statutory places until the clerks are in the bureau, working on a permanent basis. Then we ask for the statutory places in the estimates for the coming year. There is only one other change in the statutory roll. We are asking that the designation of nine machine operators be changed from machine operators to machine operators or clerks. There is no change in the salary that is requested. It will give a little more

flexibility to the roll, and will enable us to use these places for clerks or machine operators as the needs of the service dictate.

FOR GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. Your next item seems to be the general administrative item, in which there does not appear to be any change.

Doctor TAYLOR. There is no change in that.

FOR IMPROVED METHODS OF FARM MANAGEMENT AND FARM PRACTICE.

Mr. ANDERSON. The next item is on page 273, to investigate and encourage the adoption of improved methods of farm management and farm practice.

Doctor TAYLOR. There is a decrease in the lump sum, but a corresponding increase in the statutory roll, so that the total amount is the same.

Mr. ANDERSON. Suppose you give us a brief statement of what is being done under this item now.

Doctor TAYLOR. The work covered by this item includes the economics of agricultural production. This is included under two classes or headings, first, the study of the basis of production, and then the organization of production. Under the head of the bases of production we have the study of land economics or the land bases of production, farm population and country life, and agricultural finance.

Under the head of land economics we are proposing to expend the same amount as for the current year, which is \$65,000 for the lump sum and \$27,820 on the statutory roll, making a total of \$92,820.

LAND VALUATION.

One of the lines of work of very great importance at the present time, covered by this subdivision, is the question of land valuation. The work has been done on the basis of questions that were put in the last census schedule for the special benefit of our bureau, and by special studies in the field, with a view to determining the way in which land is being valued and the relation of land values to the earning power of the land, as well as to increments that have been added to the value of the land. The joint-stock land banks, the Federal farm loan banks, and the farm mortgage bankers have been very much interested in this piece of work in the last year, because the question of the size of the loans rests back upon a proper valuation of land. They recognize that there has not been any scientific method of land valuation developed in the past and this effort to develop a scientific basis of land valuation arouses a very great interest on the part of these money lenders. It is also of very great value, if applied properly, to those who are buying land in order that the prices paid may properly correspond to the earning power of the land.

Mr. ANDERSON. Has this item any relation to the cost of production studies?

Doctor TAYLOR. Yes. This has a very important application to the cost of production studies, because in the past we have had to take the land values given by the farmers.

Mr. ANDERSON. I did not mean particularly this land valuation item but this item of farm management.

Doctor TAYLOR. Yes; because whether or not you are going to operate a farm for profit depends upon buying the land at a right price and being able to borrow money on it up to a fair valuation.

STUDY OF RELATION BETWEEN LANDLORD AND TENANT.

Another problem that is being covered in this section of land economics is the question of the relation between landlord and tenant. Since two-fifths of the farms of the United States are operated by tenants this becomes a very important matter, because the relation between landlord and tenant has much to do with the type of farming and what the tenant is free to do in the management of his farm.

Mr. BUCHANAN. Do you mean you are making a study to ascertain what that relation is?

Doctor TAYLOR. Yes; and the relations which are successful and lead to good agriculture as well as the relations which tend to retard good farm management.

Mr. BUCHANAN. Then you propose to publish a bulletin on that?

Doctor TAYLOR. Yes; a bulletin has just recently been published on the relation between landlords and tenants in the black prairie of Texas.

Mr. BUCHANAN. Does that bulletin state what the proper relation should be, in the opinion of the department?

Doctor TAYLOR. It shows the relations which are proving successful and profitable.

Mr. BUCHANAN. Have you found a general class of relations that are successful?

Doctor TAYLOR. Well, of course, there is more than one factor. It is a proper form of contract along with good people that makes the success.

Mr. BUCHANAN. Have you found, in the relations between landlord and tenant, where a good tenant is not successful all the time?

Doctor TAYLOR. There are certain methods of renting land that discourage good tenants, so that a good tenant will tend to disappear or go some place else if the methods are not proper. So you usually find the good tenants and the good methods of renting going together.

Mr. BUCHANAN. What I want to get at is this: What general service is rendered by this investigation? Do you hope to change certain of the relations between landlord and tenant that have heretofore existed, or what?

Doctor TAYLOR. To give the best possible information to those who make inquiry and are studying the problem of improving the relations between landlord and tenant. Hundreds of people are continually asking questions on this subject, and what we are doing is bringing together the information which is useful to those who are wanting to improve conditions. Where there is a good system of tenancy there is a better chance that the tenants will be able to rise to the position of land owning farmers in the course of time.

Mr. BUCHANAN. I fear it will be a long time.

Doctor TAYLOR. Of course, in the South it takes a good deal longer with one class of population than it does with another.

The question of colonization has been taken up. As a large number of people are continually seeking to secure farms for themselves they turn to the possibility of getting cheap land in regions not now occupied, and large numbers of farmers have been induced to leave regions where farming is settled and go into regions where it is an experiment and in many cases where there is no future opportunity. The effort is to get together the facts with regard to opportunities in the different parts of the United States and the methods of settlement that are proving successful. Studies are being made in the progress of settlers in different regions which show what the prospects are. All of this has for its purpose a more intelligent basis of action on the part of farmers who are seeking opportunities to get the use of land as a basis for production.

STUDY OF FARM POPULATION.

Another parallel line of study, which is basic to farm organization, is the study of farm population, which has been carried on within the last few years with a view to getting the facts with regard to the conditions in the country. Particular attention during the past year has been given to an analysis of the farm population. Until the last census, the census of 1920, we had never had any information with regard to farm population as such. Rural population, which is a very different thing, has been tabulated. By special arrangement with the Census Bureau an indicator was put in before the name of each person to designate whether or not they lived on farms and whether or not they worked on farms.

On the basis of this an experimental study has been made in eight counties in the United States for the purpose of showing what is true of the farm population in comparison with other groups of population. This gives the same facts with regard to the people on farms that we have been getting in the past with regard to the city population, and also gives essentially as good information with regard to the people on farms as it does with regard to the live stock on farms. Now, we have been hearing a great deal from time to time about the shifting of population and how the maintenance of the right type of people on the farms is essential to the future of good agriculture. This for the first time gives us the beginnings of the detailed facts as to what is there and, on the basis of future studies, it will show the trends that are taking place.

MR. ANDERSON. What does it show in general, so far as you have gone?

DOCTOR TAYLOR. These tabulations are just being thrown in shape now; they are just getting through the machine work on the tabulations. They show, for instance, in Dane County, Wis.—one of the counties chosen—facts as to the question: "Is illiteracy more common in farm families than in other families?" And it has been shown that there is six-tenths of 1 per cent less of illiteracy on farms than in the country as a whole.

MR. ANDERSON. In that county?

DOCTOR TAYLOR. In that county, yes. It shows the occupations of the people who live on the farms, and a rather high percentage of people living on the farms who work at other things and bring income into these farm homes. Of course, that includes the school-teachers.

It also shows the ages of the people on the farm, the extent to which the work is done by women and children, and the extent to which the work is hired.

Mr. ANDERSON. That is all very interesting, but what I am trying to get at is: What do you do with this information when you get it, and of what practical value is it?

Doctor TAYLOR. When we are studying the question of farm production through a series of years and want to get at the trend of what is taking place, and if the trend is in the direction of depleting the human basis of agricultural production and we want to know what steps to take to maintain the human basis of production, then this analysis is helpful.

Mr. ANDERSON. Well, to discover trends you have to have some information over a series of years?

Doctor TAYLOR. Yes; but in the meantime it is important to know more than we do about the people who live on farms.

Mr. ANDERSON. Do you expect to continue this over a series of census periods?

Doctor TAYLOR. The expectation is that when this is tabulated and put in shape so as to show the significance of it—and it has not yet arrived fully at that stage—the probabilities are that there will be enough people who want this information that the Bureau of the Census may be asked in the future to include this analysis in their regular work, and if that can be brought to pass—

Mr. BUCHANAN (interposing). Then, is it the purpose to do this work through a series of years and have the Bureau of the Census make it more complete?

Doctor TAYLOR. No; that is not the idea. This work is being done now in cooperation with the Bureau of the Census in order to ascertain whether or not this will answer the questions that many people are interested in having answered, and if it does it will get information that will be wanted. It is considered very much more economical to experiment in eight counties at relatively small cost and have the experimentation carried forward by people who understand what they are trying to get than to start in at once and make the whole tabulation without the preliminary experiments.

Mr. BUCHANAN. How much of this appropriation is spent on the census proposition?

Doctor TAYLOR. This whole question of farm population?

Mr. BUCHANAN. Not the cost of production, but on farm population?

STANDARDS OF LIVING AND THE ELEMENTS OF COST IN THE FARM FAMILY.

Doctor TAYLOR. \$25,000 is being expended on the whole question of farm population and country life, but only a small amount will be required to complete this census study of farm population.

Another line of work which is being carried on under this same heading of farm population and country life is the standard of living and the elements of cost in the farm family.

Such a study is just being completed in Livingston County, N. Y., which shows the elements of the farmers' standard of living, the cost of food, clothing, rent, and various personal expenses, and general expenses for education, advancement, etc., and the part of this which

is furnished directly by the farm and the part that is paid out in cash. It compares owners and tenants in these regards. In Livingston County, for example, it is found that the owners of farms had a total expense per family of \$1,983, and of this \$1,253 was cash outlay and \$730 material furnished directly by the farm and not cash outlay; that is, rent and food coming directly from the farm; and that the tenant farmers had a total living cost per family of \$2,098, of which \$1,371 was cash outlay and \$727 was furnished by the farm, showing no appreciable difference in the cost per family of tenants and owners.

Mr. BUCHANAN. It costs the tenants more to live than the land owners?

Doctor TAYLOR. Slightly in these instances.

Mr. BUCHANAN. That must mean bigger families?

Doctor TAYLOR. That is probably true, but I have not the details on that. The average family in this survey amounted to 4.1 when we took the whole family, but when we took the whole household, including the hired help, it amounted to 4.8 per family; but it is the 4.1 that is concerning us.

AGRICULTURAL FINANCE.

Another basic line of work is that of capital or agricultural finance. In this division, in which \$25,600 is asked from the lump sum, the topics covered include a study of fire insurance, hail insurance, and the various kinds of crop insurance—the forms of insurance and the cost of securing insurance of these different forms. Also a study of the different forms of credit. Particular attention has been given to the credit associations in the various States. There are now 13 States that have laws providing for credit associations, and there are some 300 credit unions now operating in the United States, but comparatively a small proportion of them among farmers. A study is being made, particularly in North Carolina, to get the results of what has happened there and to learn to what extent credit associations have been beneficial. Studies have also been made and reports published on bank loans, mortgage loans made by bankers to farmers, and then bank loans made to farmers on personal credits. The attempt in this division is to get together the best possible information on questions of credit and insurance as they affect the farmer. There are many demands made upon the men in charge of this work for information and for help by the farmers' cooperative insurance companies in the different parts of the country, especially at their annual meetings, where the representatives of large numbers get together and talk over their problems.

COST OF PRODUCTION AND FARM ORGANIZATION STUDIES.

Now, Mr. Chairman, having covered briefly these studies of the instruments that are basic to production we come to the question of cost of production and farm organization, which is the gathering of the facts which are basic as to the right organization of the farm. Under this heading we are expending \$85,027 from the lump sum for the cost of production work and \$53,200 from the lump sum for the farm organization work. While I speak of these two items as separate, as a matter of fact they are very closely associated and the work is being carried on in the closest possible relation, because the major

purpose, as we see it, of cost of studies is an analysis of the farm business as a basis of better farm organization, although it is recognized that studies in connection with the cost of production and marketing are important with relation to tariff studies, and the Tariff Commission is asking us for the results of our cost of production studies and cost of marketing studies as a basis for some of their work.

Mr. ANDERSON. Are these cost of production studies being carried on in the same way as formerly?

Doctor TAYLOR. Yes, sir; the cost of production studies are being carried on in the various parts of the United States, and, so far as possible, in cooperation with the States, so that each dollar we spend on cost of production work results in \$2 being expended for work in this field.

I would like to give you a brief statement of what is being done in the way of cost studies. We are making beef cattle cost studies in a number of places, the cost of fattening beef-cattle on corn farms, the cost of fattening cattle on the pastures of Kansas, and also the cost on ranges. All told there are 750 farms and ranches on which these beef-cattle cost studies are being made.

Mr. ANDERSON. Do these figures show any substantial reduction in the cost of production as compared with, say, 1919?

Doctor TAYLOR. A very marked reduction in cost due both to the fact that the feeders are bought at a very much lower figure and to the fact that the feed is very much cheaper at the present time than it was.

Mr. ANDERSON. Do the figures show that any considerable portion of the stock on these farms is produced at a loss?

Doctor TAYLOR. The figures for the last winter are showing very satisfactory profits but the figures for the earlier period, when the feeders had been bought at higher prices and sold at lower prices, and when very high-priced corn was being fed to them, show definite losses, but those figures, when put in the form of returns for the corn fed to them, simply show that the man did not get as much for his corn when fed to cattle as the market price for corn indicated he might be selling it for, although we recognize that if all of it had been put in the markets the price of corn would have been different.

Mr. ANDERSON. I have the general impression that the farm situation to-day is worse than it was a year ago, but if your statement is correct—and I assume it is—that general impression would not seem supported by the facts.

Doctor TAYLOR. The impression that the farm situation is worse than it was is based upon the fact that while the elements of cost in the producing of cattle are lower, so that when you figure the relation between cost and price there seems to be a margin of profit, it is yet true that the purchasing power of the farmer, based upon a comparison of the prices of the various things the farmer has to sell with the prices of the things he has to buy, is down in the sixties. The studies also include farm practices and feeding practices on these farms, so that the studies are not confined simply to the question of the elements of cost.

Mr. ANDERSON. To what extent, for example, are the feeding practices with reference to hogs fairly standard?

Doctor TAYLOR. There is a wide range of practice and you get differences in cost corresponding more or less to these ranges. Some

farmers use a very great deal of pasture in connection with the raising of their hogs and a corresponding smaller amount of corn; others use a maximum of corn and a minimum of other feeds and pasture, and the figures show higher costs of pork production where there is a maximum of corn and a minimum of these other elements.

Mr. ANDERSON. Has anybody arrived at a judgment as to what an ideal bacon hog ought to weigh, for example?

Doctor TAYLOR. I think the people in Denmark have. The economic question with regard to that matter in this country is whether or not it pays the farmers of the United States, with the amount of feed they have available, to produce a bacon hog of the Danish type, or whether they can not produce the lard type of hog and sell it for the price they can get for it and make more money than they could by attempting to produce a bacon hog. We are hoping to get basic figures here which will show what the situation is in that regard.

Studies are being made of dairy farm management and cost of milk production on a large number of farms, altogether 1,100 farms in the Great Lakes region, including New York and the western dairy belt; then 160 farms in California and 200 farms in Mississippi.

Mr. ANDERSON. This is somewhat afield, but is this the item under which farm power studies have been made?

Doctor TAYLOR. This general item of farm management and practice has carried the farm power studies—that is, jointly—with two other bureaus.

USE OF TRACTORS ON FARMS.

Mr. ANDERSON. Have you reached any conclusion as to the economical use of the farm tractor?

Doctor TAYLOR. The figures for the Corn Belt and for the Wheat Belt show that the actual cost of getting the work done—the plowing, the pulling of binders, and work of those classes—is somewhat greater when done by tractor than when done by horses on the basis of the price of horses and the cost of feeding that has obtained in the last two years and the cost of tractors and the cost of oil, kerosene, and gasoline as they have obtained in the last two years. A comparison, when made, shows that unless there are economies and advantages in getting the work done more quickly and just at the right time in order to counterbalance this extra cost, it would look as though it were better to use horses.

Mr. ANDERSON. Is not the situation, as a practical matter, usually this: A man has about so many horses which he uses, and when he gets a tractor he is not able to reduce his horse power very much?

Doctor TAYLOR. I believe that one of the reasons why the tractor has not proved more profitable to many farmers, particularly in the corn belt, is that they need their horses for cultivating their corn and at threshing time and that there are too many horses standing idle when the tractor is at work. We expected, when we went into the wheat belt, that the facts would show up somewhat differently, but there they have to have their horses at threshing time, and, as a matter of fact, they have not reduced the number of horses on the farms as much as would seem to be necessary to reduce the total cost where they have tractors. The facts seem to indicate that where they have tractors the total farm power cost is greater than where

they do the whole job with horses. We asked questions intended to bring out the compensating advantages, but I think the studies we have thus far made do not properly measure the question of compensating advantages.

Mr. ANDERSON. I suppose there is some compensating advantage in the greater speed with which certain operations are performed, and perhaps the consequent savings in losses of crops due to that fact. Suppose a man has a wheat field that is ready to cut and perhaps it is overready; he might save some loss if he could get at it quickly with a tractor, but I doubt very much whether those advantages offset the increased cost in most cases.

Doctor TAYLOR. It seems to me that the way in which the farmers have registered themselves on the question of tractors in the last year, and the small number they have bought, seems to check pretty well with the results we secured and published.

COST OF GROWING WHEAT STUDIES.

Other lines of cost studies that we have carried forward are the cost of growing wheat in the principal wheat regions, including studies of 900 farms, and the cost of producing cotton on 640 farms in specific localities of the different parts of the Cotton Belt, and the cost of growing tobacco in Virginia and Kentucky on 180 farms.

Mr. ANDERSON. Do these studies develop any advantage from feeding grain crops to cattle and hogs as compared with straight grain farming?

Doctor TAYLOR. You mean a comparison of that kind?

Mr. ANDERSON. Yes.

Doctor TAYLOR. In the Corn Belt of Illinois and Iowa during the period of very high prices for grain the profit went toward grain farming, but during the last two years it has been distinctly in favor of those who were feeding their crops to live stock, owing to the wide difference between the price of corn and the amount of pork or beef that could be produced from the corn. That, of course, depends upon the trend of the prices of the two things, but this is true; in comparing Iowa or central Illinois, for example, experience has shown that to the extent that the corn is sold the farmers, in the very rich counties of central Illinois, have seemed to hold up their yields pretty well from year to year, and by reason of being close to the Chicago market they find it is more profitable to sell their crops.

Mr. ANDERSON. That is probably due to the freight rates?

Doctor TAYLOR. That is one important item, and the reason they can continue to do it is that they have a very rich, deep soil there that will stand that kind of thing for a long period of years. On the other hand, the yield per acre is better in that country on the farms where they have been keeping cattle. Take the large farm that used to be owned by Sam Allerton, and owned by his son at the present time. They continued to feed cattle there much longer than their neighbors because they were interested in the cattle business, and yet they finally broke over and commenced selling corn because it made them more money, and the yields from their land are appreciably higher because they stayed longer in the cattle business.

It is doubtful whether in any of these cases adequate consideration is being given to the question of permanency of yields and that a too short time point of view is taken by the farmers.

COST OF GROWING COTTON STUDIES.

Mr. BUCHANAN. What do your studies show is the cost of the production of cotton?

Doctor TAYLOR. I can not answer that right off. That would be for last year, and on the basis of the basic elements of cost which we have been gathering through a series of years and by getting, just at the close of this year's cotton picking, the elements of cost, like wages, sacks, and all of the supplies they use in connection with cotton picking, it is possible, within a relatively short time, to make a statement as to what this cotton crop has cost. On the basis of the figures that were secured in the past we showed the quantities of labor and supplies required and the present cost of labor and supplies and the yield.

Mr. BUCHANAN. So that your figures will be based upon information gathered one year as to certain elements of cost and then partly based on the yield of another year?

Doctor TAYLOR. Yes. If we know the labor requirements of the crop—

Mr. BUCHANAN (interposing). As you know, in some years it takes a great deal more to cultivate cotton than it takes in others, according to the seasons.

Doctor TAYLOR. Yes; but there is a check on that. We are carrying forward each year a certain number of studies in the different regions to give us a line on that. Unless we can get our basic figures in shape so that we can use them as the basis for calculating present costs and as a basis for changes in elements of cost the figures are always old.

Mr. BUCHANAN. Do you figure wheat on the same basis as cotton?

Doctor TAYLOR. Yes; each year we figure on the cost of wheat—but I have not the figure with me although I can get it for you for this past year—by the same method.

Mr. BUCHANAN. If you have figures at the office on the cost of production of wheat for this year, cotton, tobacco, and any other staple commodity you have been investigating, I wish you would put them in the record.

Doctor TAYLOR. I will be glad to do so.

Trend of production costs for selected staple farm products.

[1913 cost per unit equals 100.]

| Product and State. | Yield. | Cost per unit. | Index. |
|--|-----------------|---|--------|
| 1913. | | | |
| Cotton: South Carolina..... | 235 pounds..... | <i>Actual.</i>
\$0.14 per pound..... | 100 |
| Wheat (winter): Kansas, Nebraska, Missouri..... | 15 bushels..... | \$1.02 per bushel..... | 100 |
| Wheat (spring): North and South Dakota, Minnesota..... | 12 bushels..... | \$0.99 per bushel..... | 100 |
| Hogs: Missouri..... | | \$7.22 per 100 pounds..... | 100 |
| 1920. | | | |
| Cotton: South Carolina..... | 260 pounds..... | <i>Computed.</i>
\$0.27 per pound..... | 193 |
| Wheat (winter): Kansas, Nebraska, Missouri..... | 15 bushels..... | \$2.13 per bushel..... | 209 |
| Wheat (spring): North and South Dakota, Minnesota..... | 9 bushels..... | \$2.99 per bushel..... | 302 |
| Hogs: Missouri..... | | \$7.65 per 100 pounds..... | 106 |
| 1922. | | | |
| Cotton: South Carolina..... | 134 pounds..... | \$0.26 per pound..... | 186 |
| Wheat (winter): Kansas, Nebraska, Missouri..... | 14 bushels..... | \$1.25 per bushel..... | 123 |
| Wheat (spring): North and South Dakota, Minnesota..... | do..... | \$1 per bushel..... | 101 |
| Hogs: Missouri..... | | \$7.95 per 100 pounds..... | 110 |

Studies are also being made on the cost of producing rice on 200 farms in Louisiana and Texas, and the cost of producing sugar beets on 200 farms in the State of Washington and on 75 farms in Colorado. Studies this year for the first time are being made on the cost of producing cane on 50 plantations in Louisiana.

Mr. BUCHANAN. Sugar cane, I suppose?

Doctor TAYLOR. Yes; sugar cane.

FARM-OPERATIONS STUDIES.

Mr. ANDERSON. To what extent do these studies cover the cost of farm operations and the farm as a plant unit?

Doctor TAYLOR. They include a complete statement of the inventory—that is, the land and the equipment—and of the labor that is put in, so that we have a complete statement for every one of these farms showing the total expenses and total income and then the part of this that is expended upon the particular crop in question, like rice or sugar beets or cane, and the income from these particular crops.

Mr. ANDERSON. What I am interested in finding out is this: Here is a farmer who is running a diversified farm operation, feeding cattle and hogs and producing the necessary feed, etc. Now, is the whole operation, the way he is conducting it, a profitable operation or is it not? If it is, does it pay him a return on his investment and a reasonable return for the labor risk and management or does it not?

Doctor TAYLOR. Well, that varies greatly. There are some farmers who are making very satisfactory incomes in terms of dollars, as good as they made before the war, while there are others now, as then, who are producing at a loss, and you get a very large range in cost from those who show a loss and from those who are getting a very satisfactory profit.

Mr. ANDERSON. Are these differences traceable to differences of methods or are they due to a difference in managerial ability?

Doctor TAYLOR. I should say that fundamentally they are due to a difference in managerial ability which manifests itself in the way in which he carries on his business.

Mr. ANDERSON. Have these experiments been conducted on specific farms for some years?

Doctor TAYLOR. Yes.

Mr. ANDERSON. Where these studies have been carried on on one farm for a series of years do they show any improvement of method and managerial ability resulting from the studies? In other words, do they take these studies and as a result of them improve their practices so as to get better results?

Doctor TAYLOR. I can not answer that question offhand. If I had Mr. Wilcox here he could probably answer it.

Mr. ANDERSON. I have assumed that information in regard to cost on a specific farm ought to lead to the elimination of waste and the use of better methods which would, at least, produce for the farmer a more uniform income year in and year out. I suppose a farmer is like any other business man and that there are certain considerations, such as prices, weather conditions, etc., which make his net return a matter of more or less ups and downs, but it would be natural to suppose that the investigation and definite determination of costs,

arising from the use of certain practices, would result in a more uniform income for the farmer rather than a larger percentage of return one year and less in another.

Doctor TAYLOR. I think that is a very proper assumption.

There is one group of farms in Ohio where we have studied the same farms for 8 or 10 years. Our objective is not simply to study the cost of production, but the organization of those farms, and we have gone back every year and given a demonstration of the results, showing the way in which the men were farming who were making the most money and the way in which those men are farming who are making the least money. I have seen letters from men in that region making statements as to the very great benefit they have received, and I think from that region or the Indiana region, where similar studies have been made, it would be perfectly easy to work out a statement of the progress; but there are a number of items that have to be taken into account, namely, the trend of affairs with regard to the elements of cost and the prices the farmers are getting for their products, which would make it rather difficult to show statistically just how much the farmers had benefited.

Mr. ANDERSON. I am far more interested in this cost of production business from the standpoint of farm organization than I am from the standpoint of arriving at an actual or more or less theoretical determination of what it costs to raise a bushel of wheat. Such figures as apply to the whole country, I assume, would be more or less instructive; but the practical application is that of farm organization and farm management, and if as a result of a series of cost studies there has been no development of farm methods which enables a farmer one year after another to get better returns than formerly as a result of better managerial methods, then there is nothing in it.

Doctor TAYLOR. What you say is entirely true, but, as I say, I have not the statistical measurement of that benefit. However, I have no question about the benefit and the benefit is not simply to the farmers on our farms; the records are kept and analyzed and this material is the basis for the educational work carried forward by county agents for the benefit of all the farmers in a community.

Mr. BUCHANAN. No proper study of cost production could be made unless based upon proper farm management. They go hand in hand; they are linked together, and no cost of any standard commodity would be of any value unless that cost was computed upon the basis of proper farm management. The question is: What ought these things to cost to produce under proper farm management? They have got to go hand in hand to be of any value whatever.

Doctor TAYLOR. You will be interested to know that in the study of the cost of production of cotton, in Sumter County, Ga., for instance, the cost was found to be very different on different farms, and the practices different on different farms. For instance, the cost of production of cotton was less on farms where they were producing more velvet beans and more hogs and had introduced these other elements.

Mr. BUCHANAN. That is all true; but the question is what is the cost, the average cost, of the production of a pound of cotton, under proper farm management, farm organization, or what does it cost

to produce a pound of cotton or a bushel of wheat under proper conditions, the average cost throughout the United States, under proper farm management and farm organization. Now, that would be a valuable fact.

Doctor TAYLOR. We are trying to ascertain that, and also what would be the proper type of farm management. I take it that that is in line with your remark.

Mr. BUCHANAN. Yes; so that they can improve their methods.

INVESTIGATION OF MARKETING AND DISTRIBUTING OF FARM PRODUCTS.

Mr. ANDERSON. We will take up the next item on page 275, "For acquiring and diffusing among the people of the United States useful information on subjects connected with the marketing, handling, utilization, grading, transportation, and distributing of farm and nonmanufactured fruit products, and the purchasing of farm supplies," etc.

Doctor TAYLOR. I shall ask Mr. Tenny to present the statement on this item.

Mr. TENNY. This appropriation corresponds somewhat to the one that Doctor Taylor has been discussing, in that it is an appropriation for the study of the whole field of marketing and distribution of farm products.

There is an apparent increase in this appropriation of \$79,220; but due to the transfer of eight employees to the statutory roll with total salaries of \$10,780, there is an actual increase in the item of \$90,000.

PROGRESS OF WORK.

This appropriation is used to cover the research study of the processes of marketing and distribution, beginning at the farm and moving through to the terminal markets, or practically all of the work that is done in methods of marketing. The work that is done in studying the costs of marketing, and practically all of the work that is done in standardization of farm products and live-stock products, is done under this appropriation. This is chiefly a research field, but the language of the appropriation is sufficiently broad, so that in connection with the extension service we do a considerable amount of extension work also under the appropriation. This work is divided into a number of very well-defined projects, and to get the story of the whole appropriation it is necessary to take up the individual projects.

The first one is entitled "Cooperative purchasing and marketing." There is no change in the amount of the allotment that we are proposing for this project. The nature of the work in cooperative marketing, as I think was brought out last year, has been considerably changed within the last two years, and now we are devoting practically all of this allotment to what might be termed economic studies of cooperative marketing.

These studies took the form first of an investigation of the legal phases of cooperative marketing, and that work has been carried on and brought pretty nearly to a conclusion, with a bulletin that has just recently been published on the legal phases of cooperative associations. There has been a very wide demand for this bulletin,

and I anticipate that in spite of the fact that it has been issued only six weeks, we will be out of the prints in a very short time. This study considers such institutions as the Florida Citrus Exchange, and the older companies that have been functioning for a long time, and the cooperative methods used in their organization.

This study will be continued so that so far as the legal phases are concerned, we will have a very complete set of facts and a very good background for the administration of the Capper-Volstead Act, if the secretary should find it necessary to take any action under that law.

Mr. ANDERSON. To what extent are the various States enacting special laws which establish the legal entity of these cooperatives and the liabilities of the members?

Mr. TENNY. Why, I should say that during the last three years approximately 20 States have passed new legislation defining the field of cooperative marketing associations. Many of the other States had satisfactory laws prior to that time, and, as I recall, there are only a very small number of States now that have not good basic laws for the operation of cooperative associations.

Mr. BUCHANAN. Do those laws exempt the individual members from individual liability?

Mr. TENNY. You mean state the duties of the associations?

Mr. BUCHANAN. Are they put on the same basis as corporations?

Mr. TENNY. Yes; practically.

Mr. BUCHANAN. With a corporation, individual members are not individually responsible for the acts of the corporation. What I want to know is do those laws exempt the individual members of the cooperatives from individual liability?

Mr. TENNY. Yes; in practically all cases, especially the newer laws.

The second line of study being instituted under this cooperative work is what might be termed "economic study." We are collecting information regarding the 100 or more outstanding successful cooperatives, and by "outstanding" I imply especially those that have been operating for a comparatively long period. And we are getting a great deal of valuable information regarding these associations—whether they are stock companies or nonstock companies; the number of members that they have; the annual turnover; the kind of contract that they have between the member and the association; their sales policies and methods of financing; and all other factors that enter into the successful operation of their business.

We are collecting that, first, by correspondence; but we are taking a few, as the men are able to take them up, and making a very careful analysis of them and publishing these individual studies.

The first one is on the press now, and that is on the American Cranberry Exchange, which is an old organization. We have made a very careful economic study of that organization, as to how it functions over a period of years and what it has accomplished, and I feel that these individual studies will be of very great assistance to other people who are interested in organization work.

A second study is now being put in final form, that of the California Fruit Growers' Exchange, California. That has operated for 20 years, or thereabouts, doing about \$25,000,000 of business annually. And just as fast as we can we want to take up some milk-marketing studies, some cooperative tobacco and cotton associations, live-stock associations, and studies covering the entire agricultural field.

STUDY OF COOPERATIVE ASSOCIATIONS.

In connection with this project we are making for the first time in the history of the department what might be termed an associative statistical and historical study of cooperative associations. Emphasizing what Doctor Taylor said in the beginning by taking advantage of the consolidation, we use the crop estimate people in collecting these data. Through this organization we have people in practically every town in the United States who have sent us the names of every agricultural cooperative association in their district. We got about 35,000 names from these reporters. Then we circularized those, and we reduced the number to approximately 10,000 by elimination, where we found any duplication—where locals are branches of centrals, and so forth—so that at the present time, we have a list of approximately 10,000 associations in the United States. That work is not completed, and we do not feel that that is necessarily the total number. And then we are getting more information regarding the amount of business that these associations are doing, and other information of that character.

The third project that is also economic, under cooperative marketing, is the study of cooperation abroad. We have had a man for six months in Denmark studying the big developments of cooperative marketing in Denmark.

Mr. ANDERSON. That is about the eighteenth time that has been done.

Mr. TENNY. It has never been done by the Department of Agriculture.

Mr. ANDERSON. It has been done by a lot of other people.

Mr. TENNY. The changes in Europe especially in connection with cooperative marketing have been very rapid since the war. That would apply more particularly to the other powers in Europe than to Denmark, but it applies also to Denmark.

This economist is now in England finishing his studies of the relation of the English market to the Danish cooperative movement.

Mr. ANDERSON. Is he studying the cooperative buying organizations in the labor unions?

Mr. TENNY. No; simply studying the distribution of Danish agricultural products in England.

We have also had a man working on information available regarding cooperatives in Russia. He speaks and reads Russian fluently, and has been able to get a great deal of valuable information through so that we are actually getting a very up-to-date picture of the cooperative movement in Russia.

Mr. BUCHANAN. Do you think that you can get any information from Russia?

Mr. TENNY. Russia has some of the very largest cooperative movements in the world, and it is the consensus of opinion now, even among Russians, that the cooperative movement has been the one thing that has held Russia together even to the extent that it has been held together. The Russian cooperative movement has functioned during practically the entire time of the Russian difficulties.

Mr. BUCHANAN. It must be a good one, then.

Mr. TENNY. I think that will be sufficient for those projects unless there are some questions.

Mr. ANDERSON. Well, this cooperative marketing in Russia, I take it, is not the Bolshevik movement at all?

Mr. TENNY. No; the cooperative movement in Russia was in existence long before the Bolshevik government. The Bolshevik government took over the products from the cooperatives for a comparatively short period. I think about a year ago they turned the management of the cooperatives back to the cooperatives, and they have been functioning independently for the last year.

MARKETING FRUITS AND VEGETABLES.

The second project is one entitled "Marketing fruits and vegetables," in which we have an increase of \$10,000 in our estimates for 1924. We are spending \$45,000 in that project at the present time. This project covers practically all, as I have said, of the research work in connection with the marketing of fruits and vegetables. This has been largely in the past research work on standardization, and all of our standards on fruits and vegetables have been worked under this appropriation. A very marked increase in the use of these standards has been noted in the past year, especially on such commodities as potatoes, where there has been a good deal of difficulty in financing and delivering the crops. We are now asking for the increase largely for the economic lines of work. We are making a complete picture of the handling of a number of our fruits and vegetables from the producer to the consumer, studying especially such questions as in one particular case, the use of the public auction. We are in that case making complete studies of all phases of the auction trade in the larger cities; the relation of the auction and receipts at terminals to the financing of the crops and methods of financing in their relation to the methods of marketing, with the idea of ultimately having a very clear picture of all of the things involved in so far as we are able to work them out in connection with our big fruit and vegetable crops.

Mr. ANDERSON. To what extent does this study enlighten you as to the terminal-handling situation?

Mr. TENNY. In this particular project we are not spending a great deal of money in connection with the terminal handling. In cooperation with the farm people we are studying finances. In this project we are in Boston, New York, Philadelphia, especially, and also to quite an extent in Washington, studying terminal facilities and terminal handling. That is largely being financed, however, through the cost of market studies.

MARKET PRICES AND TRANSPORTATION.

The fourth project is market price trends and transportation. I am omitting the costs of marketing and will come back to it. We are now doing the same work that we have been doing in the nature of service work for the rest of the department in that contracts must be made with a large number of railroad people in order to get the information that is needed for market movements and market prices.

In connection with our live-stock movement, which is being developed to a much greater extent than it has been heretofore, our transportation man is now in the field making those contracts to get the

information that is needed with regard to the movement of live stock and live-stock purchases. We have also undertaken during this year some increased work on the relation of transportation to agriculture. We are getting, of course, some very marked changes in agriculture in different parts of the country, due to the increase of transportation charges, so we have selected one man, a trained economist, to devote his entire time and attention to these studies on the relation of the change of transportation rates to agriculture.

There is an apparent decrease of \$2,500, or thereabouts, in this, but there is a transfer of two statutory positions that will make the same allotment for next year that we have for this year.

Mr. ANDERSON. Are you able to get enough data with regard to the relationship of prices to transportation and location of agricultural products to arrive at conclusions?

Mr. TENNY. I would say that the work has not progressed far enough yet for us to determine that fact. I believe that it is safe to say that a considerable amount of data can be made available that should go a long ways toward answering some of those questions.

COTTON HANDLING AND MARKETING.

"Cotton handling and marketing" is the only cotton project in the bureau in which we are asking for an increase, and in that there is an increase of \$10,000. This is the item under which we aim to have a campaign on "know your cotton," through cooperation with State extension services. We have a large number of groups of farmers in the various parts of the Cotton Belt that employ a grader themselves. We cooperate with them in selecting the grader and in seeing to it that he does grade the cotton and give the staple on it according to the United States grades. This is a means of training the farmer to know the actual value of his cotton.

Mr. BUCHANAN. To know the value of his cotton?

Mr. TENNY. To know the value of his cotton, and we think that with the big cooperative movements in cotton, whether they are successful or whether they do not succeed, the farmer must know what he is producing and the value of the thing that he is producing. This also goes back to the point of showing where our marketing work links up very closely with our productive work.

Mr. BUCHANAN. Let me ask you one question there. Have you ever given any thought as to whether or not the department ought to make staple an essential ingredient in its grades instead of making it solely upon trash and color of cotton, or foreign substance and color of cotton?

Mr. TENNY. That matter, of course, has been given very careful consideration.

Mr. BUCHANAN. Staple is the most valuable element in cotton.

Mr. TENNY. But, of course, cotton is sold now not only on its grade but on staple.

Mr. BUCHANAN. Yes; cotton is sold on staple. Now, the buyers have been buying from the farmer, disregarding staple and buying the cotton on the color and foreign matter in it. By that method the farmers have been beat out of millions of dollars, the cotton farmers, tenant farmers and others. I can name a lot of them right now that have been beat out of a lot of money. They are getting wise to it

and are free to admit it. In the past, every year, they have been beat out of millions of dollars and they know it, and the cotton buyers are becoming rich at the farmers' expense.

Mr. TENNY. I have a little note here that this last year, under this appropriation, approximately 110,000 bales of cotton were classed for the farmers, or by the farmers' own representative. The increase in price to the farmer in marketing, not only according to the grade of their cotton, but by staple, which they do now under this method of selling, ranged from one-half a cent a pound up to as high as 6 cents a pound.

Mr. ANDERSON. How can you determine that?

Mr. TENNY. We know what the cotton sold for because they show that and we have regular reports from all of these field men, and we know what the same grade of cotton, unclassified and ungraded, by the farmers' organizations sold for in similar districts.

Mr. ANDERSON. I see.

Mr. BUCHANAN. Not only that, but the farmers perhaps have had their cotton classed and then go around without letting the buyers know that they have had it classed, and ask the buyers what they will give them for it, to make them a price, and then afterwards they will sell it at this higher price, after letting the buyer quote them a price. They have been swindled for years and years on that.

Mr. TENNY. There is no question about the truth of that.

Mr. BUCHANAN. Absolutely not.

WEATHERING AND HANDLING OF COTTON.

Mr. TENNY. The second study that is being conducted under this project is the one on weathering and handling. So much of the cotton is handled at the production points, especially, without warehousing facilities, that we are anxious to know not only the physical loss, but what spinning losses are.

Mr. BUCHANAN. Well, you have a great many facts on that already, because in past years you have been giving that considerable study.

Mr. TENNY. But we are still conducting those experiments and especially emphasizing the effect on the spinning quality of that cotton.

The increase will be very largely used, if granted, in studying the economics of the cotton market.

The cooperative movement has progressed very rapidly throughout the Cotton Belt, and we desire to get a complete picture of the cotton marketing and the place that the cooperative is playing in it at the present time and that it proposes to play in it.

Mr. ANDERSON. I do not know very much about cotton, but where these cooperatives handle considerable quantity do they sell on the exchange or do they market direct to the spinner?

Mr. TENNY. They market direct, not only to the spinners, but to the cotton factors. To the best of my knowledge, they do not sell a pound of it on the exchange.

MARKETING LIVE STOCK, MEATS, AND WOOL.

"Marketing live stock, meats, and wool" is our next project. There is in this project also a small increase. The marketing work in live stock has progressed very rapidly during the past two years. It has been a tremendous task to arrive at the grading of live stock and live-stock products, especially the meats. This work started with the meat end of it—what constitutes the higher qualities of meats—and from that end has worked back to the kind of animal that produces that meat. We are now getting the manuscript in final form to put out these first statements on the grades of live stock and live-stock products.

The same thing is true with wool. We have for the last three years done a great deal of preliminary work on wool grading. We are now having public hearings in connection with our tentative wool grades. We had two public hearings on this last week. At the hearing in Philadelphia on Thursday of last week the fact was brought out that we must do some additional research work, as there was a very strong demand there for the grades to show, at least, the English Bradford count system. Inasmuch as 60 per cent of the wools that are used in this country are imported, they felt that it would be very greatly to the advantage of the American wool industry if the same grades could be adopted for at least the mill end of the business in this country.

MR. ANDERSON. What is this Bradford count system? What is it the basis of?

MR. TENNY. Theoretically, it is based on the number of hanks of yarn that can be spun from a pound of wool. That idea, however, has been largely lost, and 80's will actually not spin 80 hanks of yarn, but the wool originally classed as 80's is still called 80's. The system runs from about 32's up to 90's, the coarser yarn being 32's and the very fine yarns being about 90's. We recognize that the English system probably would not do for the producing sections, but we are in hopes that they will at least try the arrangement. The suggestion was made by the mill trade that we can bracket certain of the groups into fines, quarter-bloods, half-bloods, three-eighths, and so forth, so that we can have a comparison between the grades suited to the needs of the mill, which are very complicated and which very closely resemble those of the English system, and the grades that the producers know now.

That is going to require some little additional work before we are ready to put out our tentative grades of wool.

I might say in connection with our live-stock work, we are really hoping that the grades of live stock can be so specific that buying and selling may be done through specifications as well as through personal inspection. A number of cooperative associations in the eastern half of the United States that buy large numbers of feeders every year, even during the last year, bought their feeders on specifications, and they have been entirely satisfied with the practice, and, of course, it saved the travel expenses and salary of a man going out into the western ranges and selecting the feeders for finishing work in the east.

We are also doing a great deal of work in the field of retailing meats, some in cooperation with other agencies and some of it independently.

MARKETING DAIRY AND POULTRY PRODUCTS.

Marketing dairy and poultry products has not been increased in these estimates. There are no changes whatever. This work is being carried along on national lines at the present time. We are studying much more carefully than we have ever studied before the functions of a cooperative association in connection with dairy marketing. Here is one of the projects that is really studying cooperative marketing that is not being financed back in the project mentioned above. There are very distinct steps in the development of the various cooperative associations. There is the bargaining association that does not handle any of the farmers' dollars, but simply makes bargains for him.

Then, there is the association that not only makes bargains but collects from the wholesaler. Then, there are others that do that and in addition manufacture the surplus themselves. And then there is another group that do all of the retailing and distribution for the farmers and make all the collections, and carry the process all the way through.

Now, we are making a study of these different groups, cooperative associations, under this project with the idea of seeing how they function, how far each association goes, and which association can or will be nearer correct in these functions. It is a difficult line.

MR. ANDERSON. Are you familiar at all with the effort to establish Minnesota brands and bring the butter production by the cooperatives up there all under one head?

MR. TENNY. Yes; and the division head has been in touch with these people, has been out there and had a number of conferences with them, and I think has been in New York also.

MR. ANDERSON. Are they making any headway?

MR. TENNY. I have not heard a thing about it for the last three or four months. I am not sure whether that is going through or not.

MR. ANDERSON. I understood they had some difficulty owing to the fact that some creameries were making very high-class butter and getting a premium for it, and they felt that if that was established, the effect would be their premium to the average of the whole State. That was one of the retarding influences.

MR. TENNY. Early in this work there was a man in charge of our dairy marketing division who was strongly impressed with the idea that they could not attempt to actually sell in New York, but that they should have their representative in New York to handle car-load shipments, so that they would get advantage of the large sales operations and then they could still have the advantage of the different concerns, in case there was any premium, but let the actual selling of the butter come along as a later development; but at that time there was quite an element in the associations out there that were not satisfied without going the whole way.

STANDARDIZATION OF EGGS.

We have been doing much work in the last year in the standardization of eggs. Very little work has been done up to this last year on that, but this year we have done a great deal of work on the standardization of eggs. We have gotten the egg standardization

work to a point where we have been able to grade eggs by our tentative standards. Under a cooperative arrangement made with the State of Missouri, a number of egg graders are employed by the State of Missouri, but under our general direction, as our grades are being used, and 90 carloads of eggs were actually graded at the various shipping points in Missouri. We were thus able to tell how the tentative grades worked out, and we have found that they worked out satisfactorily under commercial conditions. We want to continue that work and go further with it, and see just what the additional processes involved are in carrying those standards for eggs through to the terminal markets. That work has not been done yet.

MARKETING OF HAY, FEED, AND SEED,

The eighth project is entitled, "Marketing hay, feed, and seed." That project is increased this year in our estimates due to the very great demand to the markets for the standardization of hay. We have been working on standardization of hay for two years and have completed standard grades on timothy, clover, and clover and timothy mixed hay. Hearings have been held in the last three months, and beginning with the 1st of January, nearly all of the large hay associations in the eastern terminal markets have agreed with us to present to their membership, with considerable assurance that it will be adopted, the plan of having hay sold in these big terminal markets according to United States standard grades.

So while we have no compulsory grading law on hay and are not asking for any, we feel that the grades on hay are going to be adopted almost universally in a comparatively short time.

All of this work has demonstrated the need for additional work on such hay as the western hay, alfalfa, particularly, and wire grass hay, of the West, but the appropriation up to the present time, has allowed only for that being done on timothy, and that must be continued. We must do a great deal of work also in getting ready for our hay grading classes, because all of these cities will employ, jointly with us, official hay graders, so that the hay will be graded according to the United States standards.

Now, it takes about five weeks to train these men in grading hay, according to United States Standards, and it requires a great deal of hay to use in their laboratories.

Mr. ANDERSON. Are you making any investigations as to the marketing conditions of hay?

Mr. TENNY. Yes, sir.

Mr. ANDERSON. I have heard a great deal of complaint.

Mr. TENNY. I do not have them with me, but we have two or three bulletins on hay marketing that have been very well received indeed.

This allotment is also increased with the idea of doing some little work on the improvement of the feed market. There is a great deal of interest in the standardization of feeds and the standardization of methods of selling feed, and the human aspect of it, and they are very important in addition to the biologic aspect which we recognize should be taken care of by Plant Industry.

MARKETING STATISTICS.

The next project that is scheduled in the book is known as "Marketing Statistics," which was transferred to "Crop and Livestock Estimates," last year and will be discussed under that appropriation.

MARKETING INFORMATION.

The next item is entitled "Market information," \$17,000, which is just the same as last year. There is an apparent decrease of \$3,000, as a result of transfers to statutory positions. This is the project from which we handle all of our editorial work. It is simply routine work in connection with editorial work in the bureau.

COTTON STANDARDS AND TESTING.

"Cotton standards and testing," is the next item. This really should be merged with the other projects on cotton, as it is administered all in the same division. It is the continuation of the work that we were discussing there. One of the things that has been studied, for instance, under this project, is the possibility of improving the sampling of the bale, or the classing of the bale, by taking samples at the gin. The basis of this work is checking up, really, the method of taking samples from the bale, and we are finding that it is possible to get a more accurate idea of what is in the bale if it were possible to grade it at the gin.

Mr. BUCHANAN. Further than that, it prevents a great deal of loss.

Mr. TENNY. Yes, sir.

Mr. BUCHANAN. The practice of ripping a bale of cotton that long [indicating] and tearing out two or three pounds not only results in the loss of cotton, but a lot of foreign substance gets into it, and causes that much tare, I believe, or loss.

Mr. TENNY. Yes. This work is also the line of work that we do in cooperation with Plant Industry in the production of new varieties of cotton, where our bureau conducts the spinning tests on those new varieties.

As I think we announced last year, work was started on new standards for cotton, certain groups of new standards. Those will be effective in August, 1923.

We are making spinning tests also of all those new standards and determining the percentage of waste or loss in the different standards.

STATE COOPERATION IN MARKETING WORK.

"State cooperation in marketing work," is the next item. As I outlined a year ago, our program in this project has changed very materially. Originally, this was a project for the employment of joint agents in various States. The idea of cooperating with men did not prove successful, and, therefore, we began about 18 months ago to change this over, and we are now cooperating with the States on projects. We are entirely satisfied with the new arrangement. That project is conducted very largely in cooperation with our other projects. It covers research and extension work especially. It gives us a fund from which we can make experiments where a State manifests a desire to cooperate on some one of our

various projects. Now, that may be in the cost of marketing; it may be in a study of terminal marketing, such as we have in Massachusetts; it may be a question of standardization of tobacco, as is the case in about six of the tobacco States, where the States are very much interested in the continuation of the work and where we have a special fund that we can cooperate with the States on those various projects. I do not think that it is necessary to go any further into that, because it is not a project by itself any more.

GRAIN INVESTIGATIONS.

The next is "Grain investigations," which is the last of these, with the exception of one which was transferred to Plant Industry last year.

Standards have been arrived at for corn, wheat, and oats. That has been done in the past. Standards for flax and rice are being worked on, and they are practically completed. Standards for rye and barley are also being developed. That work is all of our standardization work.

Our research work is paid from this appropriation. In addition to that standardization work, there are three lines of work that we have given special emphasis to in the last year. One is the grain cleaning work, and if you do not mind looking at these samples, I would like to have you see the results of this cleaning work. This [exhibiting sample to committee] represents on the left the wheat as it was originally threshed, and it has been sold through the channels of trade in practically all the Northwest. So, our idea has been to develop a cleaning machine which can be attached to the thresher, working automatically with the thresher. The second sample of wheat shows what is accomplished by the cleaning method, and the other two small squares show the material that has been taken out.

Now, those three different types—you will notice the information at the bottom of this one [indicating] that as the wheat has been threshed, there is 9 per cent dockage on which freight was paid, and on which all the marketing processes were paid. After using the cleaner, that dockage had been reduced to less than 1 per cent in this particular sample. The percentage of foreign matter in this sample [indicating] is reduced only slightly. The total foreign matter before cleaning in this sample [indicating] is 9.6 per cent. The total foreign matter after cleaning is 1.3 per cent.

Now, on the basis of these, and on the inspections that were made in Minnesota inspection points, we have estimated that in the course of the year 1921, 9,500,000 bushels of foreign matter entered into commerce.

Mr. ANDERSON. What is the effect of this cleaning on the grain, on the wheat?

Mr. TENNY. Well, up in the right-hand corner, you will notice the change.

Mr. ANDERSON. I see. That is what I was looking for.

Mr. TENNY. In this particular sample, after cleaning, No. 1, which weighed 58½ went up to 59 pounds. Often it raises the grade.

Mr. BUCHANAN. Ordinarily, what is the difference in price between No. 2 and No. 3 wheat?

Mr. TENNY. The difference in price between No. 2 and No. 3 wheat averages between 2 and 4 cents per bushel.

Mr. ANDERSON. Is this a laboratory proposition, or have you really developed this machine?

Mr. TENNY. The machine has been developed and is being installed to be used very generally this next year.

Mr. ANDERSON. Has it been adopted by any large separator manufacturers?

Mr. TENNY. Yes, sir; I do not have the name, but I know it has been adopted by one of the largest ones.

Mr. ANDERSON. Is there a public-service patent on this, or whatever you call them?

Mr. TENNY. The basic principle of this was patented prior to our doing the work, but the machine was not a success in practice as it was too heavy, so we have worked out a very much lighter machine that meets the requirements of the thresher; and, as I recall it, the patent could not be issued; we could not obtain a public patent.

Mr. ANDERSON. Is this attached to the separator, or is it an additional machine?

Mr. TENNY. No; it is attached to the thresher.

Mr. BUCHANAN. It is made a part of the thresher?

Mr. TENNY. It is attached to the thresher; yes, sir.

Mr. ANDERSON. What does it cost to produce one of these?

Doctor TAYLOR. Approximately \$500.

Mr. TENNY. This machine weighs approximately 600 pounds.

You can see that this was an important part of our "Know your wheat" campaign, and it is important to the farmer in improving his wheat after he does know the imperfections in it.

Now, a similar line of work is being carried on in the southwestern territory, where we had heat damages which we have found during the last two years has increased to a point where it affected the marketing of the wheat very seriously. Our laboratory experiments show that this is due primarily to the fact that wheat is being cut and threshed and in the farmers' barns before it is quite mature. It is apparently mature, and when we cut it and put it in bundles it had an opportunity to go through that last ripening process.

Now, since they have adopted the hurry-up methods, in order to produce another crop after cutting the wheat in that country, this heat damage is developing.

Mr. BUCHANAN. They do not leave it in the shock long enough?

Mr. TENNY. No; and they are developing methods of threshing directly in the field, topping and threshing.

Mr. BUCHANAN. Clipping it?

Mr. TENNY. Yes, sir. Of course, all of this wheat work we carry through our baking tests, and determine the effects of heat damages and the relative amounts of heat damage on the bread, by baking, and we have arrived at a point now where we can say that wheat that is damaged above a certain amount, is practically useless for bread making at all and must be used for feed purposes.

The third study is our economic study, which Doctor Taylor touched upon, and which probably needs no further elaboration. We are making, and during the next year, we propose to make a complete study of the marketing processes involved in the handling of wheat, particularly.

COST OF MARKETING.

Now, I would like to ask Mr. Schoenfeld to cover the one project that we have omitted, the cost of marketing. Mr. Schoenfeld is in charge of our research work and this costs division is operated almost directly under his supervision.

MR. SCHOENFELD. Doctor Taylor has outlined the lines of study we think are necessary in the marketing processes.

Before we can attempt the solution of problems encountered in the marketing of agricultural products, it is absolutely necessary that comprehensive studies be made of the various steps, processes, channels, and functions involved in the marketing of commodities. Along with such steps it is necessary to measure the costs of these various steps and to ascertain from these studies which are economic or not economic, the very items pointed out in the cost production studies.

Before it is advisable to make such detailed cost studies it is desirable to study margins or charges exacted, rather than to plunge into detailed cost studies, which are time consumers and expensive and which do not always yield what is wanted.

After we have studied these margins and have segregated them so as to be able to see the margin for the man who handles the commodity at the point of shipment, the transportation agency charge and the terminal marketing margins, then we are in a position to approach the whole problem of costs in a more logical manner.

During the present and last fiscal year, a comprehensive study of the costs of marketing live stock was started in the corn belt and was continued into the present fiscal year. This study has been extended so as to include the territory in the South and West. The data secured is now being tabulated, and is practically ready for publication. We have found, however, in these data, certain factors which were entirely unlooked for in our preliminary cost studies. It will be necessary to go back and determine just what the causes and conditions were back of these factors.

For example, in our live-stock marketing study we find that where there are mixed shipments of hogs, shipments in which cattle or sheep were in the same car, that universally the number of crippled hogs and dead hogs was higher in such shipments. We find, also, that the number of crippled hogs is higher in the winter months and late fall months than during May, June, and July. It will be necessary to ascertain the reasons for these losses, and, as pointed out by Mr. Anderson in his reference to our cost of production studies, cost studies should indicate the losses with recommendations as to how to avoid or reduce them where possible.

We have found, for example, that where it is popularly assumed that marketing margins of certain agencies were high, that these margins might be low in comparison with other agencies that take a larger proportion of the spread between consumer and producer.

MR. ANDERSON. How far have you gone along with this margin study?

MR. SCHOENFELD. In some commodities—potatoes and onions, apples, and in some of the dairy commodities—we have merely completed such studies of margins from the producer to the consumer. Probably 25 or 30 commodities are now being studied in this manner. We have retail margins on some commodities covering

a long period of time; that is, a period of a year and a half to two years. I am coming to the part which will probably answer your question. There is great difficulty in going back to original records, if there are any. This a time-consuming process. One of the problems we have is to pick out retailers who are open-minded enough to open their books, and if they do not have books, or records, or papers, give us information so that we can use their data from which to derive service margins.

Mr. ANDERSON. When you attempt to get these figures, do you take the individual dealers, or do you attempt to get volume transaction which will give you a general average?

Mr. SCHOENFELD. Yes; we are getting at it in that way. We try to take typical establishments. I will use as an illustration a study on which we are now working. In Boston we have taken exclusive retail trade stores; the middle type of retail establishment and the low-priced cash and carry; chain and bargain counter establishments. We take this as being typical of a cross-section of the retail business.

Mr. ANDERSON. That is in the meat trades?

Mr. SCHOENFELD. No; we are making the studies with fruit and vegetable and dairy products retailers. In Boston we have started on the meat trade, and also in Chicago. I will dwell on this later on. In Chicago we are working with the Retail Butchers' Association and are cooperating with it in getting costs of retailing meat.

As I have pointed out, we are having difficulty in getting satisfactory records. Where retailers are willing to cooperate, we find that their records are not in such shape that they can be used. For instance, they will record a sale of apples. That may mean anything from western boxed apples to eastern barreled apples, or it may mean ungraded apples. Records are seldom kept of the grades or standards.

In the Pacific Northwest we are making a study of the cost of marketing boxed apples from the time they leave the orchard to the terminal end. We are getting cooperation in Philadelphia and Boston, Chicago, and New York City from some of the local research agencies in the study of the terminal distribution of apples and other fruits and vegetables.

This work is necessary, more necessary than some other types of market research. We can not go to a library or to a definite agency and collect this information. It is necessary to go to the books of various marketing agencies, work with them, and over a long period of time. For such type of work it is not advisable or practicable to use untrained men. It requires men with a large amount of tact who can handle rather delicate situations constantly arising and who can see the facts when they appear. The ordinary man trained in accounting is not completely fitted for this type of work. He must have in addition to his training in accounting a broad, common-sense training in business practice. He must see things that an ordinary accountant would overlook. The accountant usually sees the figures before him and does not always see the related facts. For that reason we find it necessary to engage a well-trained, high type of personnel.

. After we have made margin studies then we hope to proceed with rather detailed cost studies. We are continuing some of the studies in the recent marketing of live stock. At the request of the Master

Butchers' Association of Chicago we are cooperating with the Northwestern University in making detailed study of the accounting methods and systems used by the retailers of Chicago.

Mr. ANDERSON. To what extent is this done in connection with, or do you use the figures of, Harvard University?

We are making cost studies of the marketing of Maine, Wisconsin, Michigan, Massachusetts, and Minnesota potatoes, which are continuations of the work started last year. We are covering the entire costs from the time the commodity leaves the producer to the time it reaches the consumer. We are finding quite a little interest in this subject, and are getting plenty of offers of cooperation, some of which we find it necessary to turn down. In some places agencies that are anxious to do this work are too anxious to prove that certain types of middlemen are entirely unnecessary, wrong, or dishonest. That condition of thought is disastrous in good research. Where that occurs, of course, we have to decline the offer of cooperation. We are trying to get others to cooperate with us and to look at facts as they are.

As Doctor Taylor pointed out, it is contemplated that a complete study of marketing agricultural crops, such as grain, fruits, vegetables, dairy products, cotton, wool, and live stock, will shortly be made. Along with such study should go the study of costs of marketing. The marketing picture is not complete without such studies. The appropriation increase of \$28,000 is to cover the study of market margins and costs of these commodities.

TERMINAL HANDLING OF FRUITS, VEGETABLES, AND OTHER PERISHABLES.

To give an illustration of some of the things which cost studies are developing: In cooperation with the port authorities of New York City we are making a study of the terminal handling of fruits, vegetables, and other perishables. We have found, by studying the costs of handling of commodities, after unloading on the Manhattan terminal piers of the Pennsylvania and Erie railroads, that the cost of handling of crates of commodities from the piers to the roadway, or marginal way, as it is called, that the charge may be as great as the entire freight cost from the point of production to the Manhattan piers.

Mr. ANDERSON. Including the freight?

Mr. SCHOENFELD. The charge for hauling from the pier to the road way, a distance of 400 feet, may be as great as the freight charges from the point of production in the West or the South to the Manhattan piers.

Mr. ANDERSON. I do not doubt it a bit.

Mr. SCHOENFELD. That has forcibly brought out expensive practices. The port authorities of New York City are very much interested in that point. It brings out the necessity of regulations for the terminal handling of fruits and vegetables in New York City.

Mr. SCHOENFELD. Harvard has done nothing in the retailing of meats.

Mr. ANDERSON. I know, but they have done a lot of work in other retail work that could be used in connection with the retail of meats?

Mr. SCHOENFELD. That particular study in Chicago is with the master butchers. I might say in that connection that some of the men now working on these cost and related studies of produce and vegetables are Harvard men, trained in the Graduate School of Business Administration and in its methods.

Mr. ANDERSON. Do you find any butchers that have any records?

Mr. SCHOENFELD. Very few. We found, on the other hand, a great desire on their part for an accounting system, and we have worked out forms that will be for sale by the Public Printer. These will be used by certain meat retailers in Chicago and other places. In exchange for that service on our part the meat retailers are to cooperate with us. This shows a helpful attitude on their part to cooperate with us in our studies. Proper accounting should help to reduce the costs of retailing meats.

TUESDAY, NOVEMBER 28, 1922.

FOR CROP AND LIVE-STOCK ESTIMATES.

Mr. ANDERSON. What is the next item?

Mr. CALLANDER. The next is the Division of Crop and Live Stock Estimates of the Bureau of Agricultural Economics. The total allotment of lump funds to this division for the current year amounts to \$301,600; an apparent increase of \$7,000 is included in the estimate. There are some transfers to the statutory roll which makes the real increase in the estimates for this division \$25,000 for the fiscal year 1924. This division is a part of the old Bureau of Crop Estimates. The part of the work of the old bureau relating to foreign statistics has been put into another division, which will be taken up immediately after I get through. This division is coming to be the principal data-gathering machine for the whole bureau. It is not only doing the regular crop estimating work, but it is cooperating with the Farm Management and other divisions in gathering economic data. There are now in the division 174 persons, 84 in Washington and 90 in the field. Of the 90 persons in the field, about 48 are agricultural statisticians who have been appointed as a result of civil service examinations; 2 are live-stock specialists, and there are about 40 clerks. The division has offices in 42 States at the present time.

The New England States are combined; Kentucky and West Virginia are considered as one unit, and Utah and Nevada are considered as another unit. In each of the other States the division has an office with a statistician in charge. There are now about 260,000 volunteer crop correspondents altogether. That makes an average of about 10 for every agricultural township in the United States. Of that number, 26,000 are township correspondents—that is, one in each township, who makes monthly reports direct to Washington. There are 28,000 correspondents called field aids, 1 in each township practically, who make reports to the field statistician in each State. There are 2,700 county correspondents, 1 in each of the agricultural counties of the United States, and in some of the more important counties there are 2. Each of those county correspondents has a corps of reporters who report to him, and he compiles his reports from what they send him and sends them to Washington. There

are 30,000 live-stock correspondents. This is a new work that is being developed this year, and we expect eventually to build the number up to 60,000 live-stock correspondents. This does not include the 300,000 farmers who are reporting through the rural carriers of the Post Office Department. Then we have 50,000 other correspondents whom we call individual farm correspondents. They report to Washington for their own farms only, covering acreage, production, and matters of that kind. We have another 50,000 farmers who report in the same way to the field men.

This duplicate system is used so that one may be used as a check upon the other. There are 6,300 special cotton correspondents, 3,800 honey bee correspondents, 7,500 special data correspondents, 2,000 maple-sugar correspondents, 13,000 truck crop correspondents, also 2,500 canners' associations correspondents who report every year the total amount of fruits and vegetables canned. Practically all canners are on this list. During the present year, 3,000,000 schedules were sent out from Washington, and at least 3,000,000 more from our field offices. From these returns, during 1922, about 48,000 separate and distinct estimates were made on various factors relating to the crops and live stock.

Six thousand of these estimates related to live stock, and 12,000 to prices; the balance related to acreage, condition of crops, and yields. The truck-crop work in the field is carried on by two truck-crop specialists. The work on truck crop in Washington fits in with the other crop work, and is done by the same people, so that the cost of it here in Washington is relatively small. Nearly half a million truck schedules were sent out this last year, and 79 separate and distinct reports were made on truck crops.

COOPERATION WITH THE STATES.

All of the work of the division, wherever possible, is done in cooperation with the States. We already have arrangements with 28 States. The States are Alabama, Arkansas, California, Colorado, Idaho, Illinois, Indiana, Iowa, Kentucky, all of the New England States, Maryland, Minnesota, Missouri, Montana, Nebraska, New Jersey, Michigan, New York, North Carolina, Ohio, Oklahoma, Utah, Virginia, and Wisconsin. The States are putting into this crop reporting work somewhere between \$75,000 and \$100,000 a year. That is an estimate, of course. Some of the work is mixed in with other State work, so that it is hard to tell how much the States are putting in. These cooperative arrangements are extremely beneficial in two ways: First, they have eliminated duplicate reports in many of the States and the single report that is now made has been strengthened. It has been possible to merge the clerical help, the reporters, and the funds. In practically every State where these cooperative relations are in effect the work is going along in a very satisfactory way, and we are able to get much more detailed information concerning each individual State than was possible before these cooperative arrangements were made. Second, it has kept down the expense to the Federal Government of doing the crop-reporting work.

LIVE-STOCK REPORTING PROJECT.

For the current year there is an increase in the funds of this division, practically all of which has been used for starting the live-stock reporting project, which is now getting under way in good shape and already showing some results.

I might say that up to this year the live-stock work of the division has been very limited and very unsatisfactory to the live-stock interests in that the statistics have not been in sufficient detail to furnish the information that the live-stock interests needed. The work included up to this year simply an annual estimate of the number of live stock on farms, based on a percentage method of estimating, taking the census as a basis. The mortality of live stock has also been estimated, the report being simply an index number showing the relative mortality from year to year. The number of brood stock on farms on the 1st of April has been estimated on a percentage basis, and the number of stock hogs on farms on September 1. That represented all of the live-stock work. When we began to plan for the new work it was found that there were so many demands for work it would be necessary to limit it to certain fields in order to get results, or the work would be spread out so much that nothing would be accomplished. Two conferences were held, one in Chicago in May, and the other in Denver in July, at which were present a number of live-stock producers and representatives of live-stock associations, railroads, and other organizations.

In addition a number of men who could not be present, like representatives of the Texas Cattle Association, for instance, send letters suggesting what they wanted in the way of service, and based on the meetings in Chicago and Denver a rather elaborate program of what the live-stock reporting service should include was outlined. We ascertained directly from the people who are raising stock what they wanted. Mr. Bixby, Mr. Tomlinson, and some of the other live-stock association men told us what they wanted, and our program is largely based on what these men said was needed. The program as now outlined includes the following things: First, an effort will be made to make the January 1 estimate of numbers on farms more accurate and have it give more details than in the past. Heretofore the division has simply reported the number of cattle and milk cows, sheep, swine, and horses, but nothing as to age or sex. This year will be the first attempt to separate the classes of cattle into steers, bulls, and cows and calves, and, if possible, make an estimate as to the number of steers of different ages. The information will be gathered in several ways, the principal one of which will be to get reports from thousands of individual ranches and farms, telling just what they have on their own farms, in the way of stock of various classes and ages, and from these reports work up ratios which will be applied to the totals.

Four regional live-stock men have been put into the field and several assistant live-stock statisticians have been added. We now have a live-stock statistician in Texas, a regional live-stock statistician for Arizona and New Mexico, a regional man in Denver, with an assistant, one in Wyoming, who covers the Wyoming-Nebraska-South Dakota area, one in the Great Basin area, with headquarters at Salt Lake City, and through an arrangement with the Live-Stock Marketing

Division one of them in California will do considerable of this work in California in addition to his work on the marketing end.

Then a live-stock specialist has been put in Iowa, one in Illinois, and a regional live-stock specialist has been stationed in Chicago, who has his office with the marketing division. The live-stock reports are to be cleared through the Chicago office to a large extent, where they will be combined and fitted in with the marketing reports, so that the whole project of reporting on the markets, reporting on the receipts of live stock at various stock yards, and the estimates which this Division will make will be one and the same project. There will be close cooperation between all the lines of live-stock work, which, we think, will improve the service. Then an arrangement has been made with the Post Office Department to make a semiannual pig survey. One was made last spring which was very complete. The returns from the 17 states in which we made the survey included about 10 per cent of the farms, and from the statistical standpoint a sample of that size is abundantly large enough to give a picture of the whole; in fact, we think the number of reports could probably be cut down to 5 per cent, which would be much less expensive and still obtain a very exact picture of the whole. At the present time another survey is in progress, and we already have in about 200,000 schedules from all over the country. I noticed this morning that something like fifteen or twenty thousand have come in from Iowa.

Mr. ANDERSON. Are these schedules pretty accurate and do the farmers make them out carefully?

Mr. CALLENDER. They are made out for the most part by the rural carrier himself; he asks the questions and fills in the answers, just like a census enumerator. Those are the instructions, at least, which go out, and each carrier is instructed to pick a section out of his route of 10 consecutive farms. He is instructed not to select his farms, but to take every farm as it comes, regardless of size or ownership, until he gets 10 reports. From these reports we hope to be able to work out the ratios. For the first year the information is not particularly valuable, because we have no comparisons that are satisfactory; but beginning with next spring's survey we will have comparisons, and I feel that these pig surveys are going to be of great assistance in showing trends in hog production, and I think, based on these surveys, it will be possible to forecast very accurately and a good many months ahead what the supply of hogs for marketing is going to be.

I believe these estimates can be made very accurate, because we have as a check the receipts at the stockyards as well as railroad movements, and we are arranging now to get from the stockyards and from independent packing plants which do not get their stock through the yards direct the state of origin of all the stock coming to their plants, so that we will be able to forecast how many pigs Iowa, for instance, will produce and check the forecasts from the actual records of what go to market. Based on the surveys and checks we will be able to forecast after this coming year, I think, how many pigs we may expect from any State during a season. I doubt if we can estimate very closely the number to be marketed in any one month, but for a season I think we can forecast quite accurately.

That covers what is being done on the pig survey. If continued, I think it will develop into one of our most important pieces of live-stock reporting work.

Every month, based on returns from 30,000 farmers, we are reporting the monthly changes in numbers of live stock on a ratio basis. This work was started experimentally about four years ago, but we have started into it on a much wider scale since the first of July under the new appropriation. These monthly changes—

Mr. ANDERSON (interposing). Do you mean monthly changes in hog production?

Mr. CALLANDER. Yes; we report the monthly changes in hog production, as well as for cattle and sheep. Here is what we do: We have these 30,000 farmers who report to us once a month how many cattle, sheep, and swine they have on their farms on the 1st of the month and how many at the close of the month; how many were born during the month, how many were sold, and how many were slaughtered, and how many died. From that we are getting an index number showing the ratio of the number born, died, sold, purchased, and slaughtered bears to the total number on the farm. It is really a sort of bookkeeping account. This work will be expanded eventually to include about 60,000 farmers reporting once a month as to what happens on their farms. That will give us a very splendid index and even the experimental data that has come in so far has been very valuable on hogs, being borne out by the receipts at the stockyards. We also ask how many sows are bred each month, and we have found quite a correlation between the number of sows bred and what goes to market some months later. We feel that is going to become a very important index for the future and enable the livestock producers to get a picture of what is happening and thereby determine whether they should increase or decrease their herds; in fact, some of them are already using the data, but we are not giving much publicity to the work until we can develop it further.

Mr. ANDERSON. When they get to using it, that will modify your returns, will it not?

Mr. CALLANDER. The thing about it is this: A great mass of farmers will probably not pay much attention to it, at least for some years, but there will be quite a percentage of the farmers who will profit by it from the start; enough to tend to stabilize the movement to market.

FARM PRICES OF LIVE STOCK.

Then we are estimating the farm prices of live stock. We have been doing that for a great many years and, of course, will continue.

We are also planning to make and we are making right now—the report output will come out on December 10—an estimate of the number of sheep—

Mr. ANDERSON (interposing). Before you go into that, I have always had a great deal of doubt about the accuracy of your estimate of farm prices, and I would like to know how you get at them?

Mr. CALLANDER. We do not say they represent actual prices, but our contention has always been that they give us the trends from month to month and from year to year. They are gotten in this way: We have a corps of price reporters and the number runs up to 1,000 per State; in some States we have as many as 1,000 reporters who report the average farm prices that are being received in their territory. Now, what makes the figures appear to be off sometimes is that these figures come from importing areas as well as from areas.

of surplus. In other words, here is an area—and I will take potatoes as an example—that only produces about one-fourth of its potatoes and has to import all the rest; the price of potatoes in that area is very much higher than it is in another area which ships out potatoes and that naturally raises the average State price. We have been thinking for some time of trying to work up a system of price reporting which would give us the price in surplus areas in addition to State averages. You see, now there is one average for a State which also includes the prices in areas which import. Whether we can work out something or not I do not know, but that is what causes the prices to seem too high when you take an average for a State.

Mr. ANDERSON. How do you weight these prices when you come to get an average for the whole country?

Mr. CALLANDER. We weight by production. The prices for each State are weighted by districts for some crops and by counties for others; we use nine districts in each State for weighting purposes, and we weight the price for the State according to the importance of those nine districts, and then we weight the price for the United States by relative importance of each State. Of course, greater accuracy could be secured—but it would involve a great deal more work—if we weighted each State by counties for all crops. Most of the prices for the principal crops are weighted by county.

Mr. ANDERSON. Do those weighted figures continue the same every year?

Mr. CALLANDER. No; they are adjusted from year to year.

Mr. ANDERSON. To the production?

Mr. CALLANDER. Yes, sir. Returning to our live-stock work, as I just stated, we are going to issue on about the 10th of December the first estimate as to the number of cattle and sheep on feed in the Corn Belt, and in the case of sheep the number, also, on feed in the Greeley and Scotts Bluff area in the West. Our men are working on that now.

PASTURE AND FEED CONDITIONS ON THE RANGE.

We are making monthly reports on pasture and feed conditions in all the range States; also on the condition of live stock and live-stock prices on the range. Those reports are coming out once a month. We began in September—and we are about half through—to compile a complete record for three years back, from railroad data, of the number of head of cattle shipped out of each station and shipped into each station in all States from Ohio west. A number of railroads have been kind enough to furnish the data free of cost but for some we have paid the actual clerical expense required in compiling the information. We feel we must have these data as a basis before we can make intelligent live-stock estimates, because we are planning, as soon as we can get these data worked up, compiled, and thrown into counties and regions, to estimate live-stock supplies and forecast the probable market movements of stock from different areas.

Mr. ANDERSON. Do you expect to get these railroad data every year?

Mr. CALLANDER. Yes; we hope to be able to make such an arrangement with the railroads, in fact, a number of them have already agreed to furnish it to us monthly hereafter. We have that matter

up now with the railroads informally and quite a number of the big roads have agreed to furnish this information to us monthly hereafter; it means quite a bit of expense to them but they have agreed to furnish it. The railroad and stockyard data will afford a basis which will enable us to forecast that out of a certain area there is going to be shipped; so many head of cattle or so many head of stock of any other kind; in addition we will have the subsequent railroad and stockyard records as to the actual movements to use as a check against our estimates, and we ought, as time goes on, to make more and more accurate forecasts of the movement.

SPRING MOVEMENT OF SHEEP AND LAMBS.

One little piece of work which has attracted quite a bit of attention and interest is our plan to estimate the probable spring movement of sheep and lambs from California, Arizona, Kentucky, Tennessee, West Virginia, and Virginia. The movements from these areas come very close together in the spring and early summer, and when they overlap they hurt the sheep market.

We will first show how many head are likely to come out of each of these areas. We have the machinery in motion and I think we are going to be able to make rather accurate estimates. Then we will report when the movement starts from California, for instance, and when the movement starts from these other areas, and arrange with the stockyard companies and railroads to make weekly reports, if they can, as to what is moving, so that the people in Kentucky and Tennessee can avoid getting their stock on the market when stock is coming from California or vice versa. There is a great deal of interest in that particular project at the present time, because when that stock all comes in at the same time, especially into the Jersey City market which happens frequently, the price goes to pieces.

Another report on the program is an estimate of the calf and lamb crop in the range States, so that we may have a long time view of what the future supplies.

I might say that in all this work we have the live-stock associations back of us; they are helping us, their membership is reporting and their leaders are backing us up in the work.

Mr. ANDERSON. Probably they will feel differently about it when they find out what you are going to do?

Mr. CALLANDER. The things I have mentioned are the things the live-stock people have asked for and we are trying to shape our projects in the West and Middle West to give the producers what they want.

SPECIAL REPORTS.

Then there are a great many other special reports relating to localized areas that we are planning to make, but it is hardly worth detailing them here. For instance, an estimate of prospective movements of grass-fat cattle from southern Texas will be made in February; an estimate of lamb crop of California and early lamb crop of Arizona, also Idaho and Colorado, will be made in March; report on condition of pasture in Kansas Flint Hills short-grass areas will be made in March; that is very important to the people who bring cattle from Texas and put them on the Flint Hills pastures; the

movement amounts to about 150,000 or 250,000 head, that being the number brought in there in the spring. The prospective movement of grass-fat sheep from west Texas will be estimated in March. Another report on the condition of Kansas Flint Hills and short-grass pastures will be made in April. An estimate of fat cattle movement from California will be made in May. An estimate of number of cattle which have gone from the Southwest States to Oklahoma, Kansas, and other northern pastures will be made in June; that will give an index as to what fat stock will come from those areas in August, September, and October. Estimates of the probable number of fat and feeder lambs available for shipment from Arizona, Idaho, Wyoming, Montana, Colorado, and New Mexico during July and August will be made in June; that will give an index as to the supply of feeder lambs for the corn belt.

A estimate of the number of grass-fat cattle coming from Montana, Wyoming, and South Dakota, etc., to market. That will be a general inquiry which will be made in July. An estimate of the calf crop of Texas, New Mexico, and Arizona, which will be made in September. I have already mentioned, I think, some of the other things we have already started and I will not go into them again.

COOPERATION WITH LIVE-STOCK ASSOCIATIONS.

I have also mentioned the cooperation we have with the live-stock associations, and I might say that we have been directly helping these associations. We are helping through our work to put the feeders in the Middle West in touch with the people in the West who have the feeders to sell. We are doing the work in this way: We get these men to report to us and tell us how many cattle or sheep of different kinds they have; we are turning that information over to the associations and the associations are drawing it off and sending it out and then handling the business themselves. Just recently we have helped to locate pastures in Texas and some other areas for the cattle which were starving in New Mexico. We have done quite a bit of that indirectly and as an incident to our other work. We do not consider it a part of our work but we help wherever we can.

Mr. ANDERSON. The information is there, and there is no reason why they should not have it?

Mr. CALLANDER. That is true, and we are making the greatest possible use of the information we are gathering.

CROP-WORK STUDIES.

I have not mentioned anything about our crop work, but that has gone on about the same, and we are spending about the same amount of money this year as usual. However, I might say this: We have just put into the Washington office one of our experts from the field, who has made one of the best records as to devising new methods and better methods of crop estimating.

During the last year or two we have devised improved methods of estimating acreage, which is our greatest problem in crop estimating. If we can get the acreage accurately, the rest is rather easy.

So we have, within the last year or two, been experimenting, and now we have worked out two or three new methods of estimating

acreage, which are being put into practice which will have a very important effect on our estimating work of the future. If you are interested, I will mention them. One is by getting enough individual farmers to report what they themselves have grown and produced, so that when we get a great many thousands of these reports put together we will have a fair sample of the whole country. We have made some studies as to how many we need to do that, and our studies so far would indicate that if we could get about 2 per cent of the farmers of the country to tell us exactly what acreage they have in crops we would have enough to give us a true picture of what is happening. We have done that this year in every State, and our revisions for December will be based largely on those studies. Then we have encouraged the development of the assessor's census, as you might call it, and in about 15 or 20 States the States have passed laws which require the assessors, at the time of making their annual assessments, to take a census of the acreage and numbers of live stock.

In about four States the data have become so accurate that we feel it is really better than the United States census so far as acreage is concerned. That is especially true in Wisconsin; in Minnesota this year they are taking it for the first time and it is extremely satisfactory; Michigan has an annual assessors' census as well as Iowa, Nebraska, Missouri, and Colorado. We are anxious to see and are encouraging the passage of State laws which will give a census in every State. Then we have also, following out the suggestions made by a statistical committee of experts who investigated our system last winter, started a system of field counts, as we call it, that is, each of our field statisticians takes a certain line of railroad or certain road and he covers that same area each year. The arrangement now is that he will take enough of those roads in his State to give a good cross section of his State and will count the number of fields of each kind of crop along those roads, making an exact record every year of what changes have taken place. In the case of fields that are not of good shape or are of odd sizes we are trying the experiment of counting the kind of crop that is opposite each telegraph pole. We find the field count is a very satisfactory way of estimating the changes in acreage from year to year in the East and South, but it is not so satisfactory in the West.

Some of our men are quite enthusiastic about the accuracy with which changes in acreage can be determined by counting the fields from year to year over exactly the same area. In a State like Georgia, where it has been tried out to the greatest extent, it takes about 4,000 miles of road, covered year after year in exactly the same way, to determine the change that has taken place during the year. I might say that last year in South Carolina our statistician covered about 3,000 miles of road and estimated the cotton crop based on his survey. His estimate was about the same as that finally determined in December after the ginning returns were nearly all in. All of the other sources of information gave a much lower acreage than his survey, but as it was a new experiment he was to trust the results.

INCREASE USED FOR LIVE-STOCK WORK.

The increase for the coming year will be used in part to strengthen the livestock work. The division simply can not begin to meet the demands on it for livestock information; it is expensive to get railroad data and other information of that kind, and we want to put on about two or three more men to strengthen the service in the Corn Belt States. We were only able this year to put on two livestock men in the Corn Belt besides the regional men in Chicago.

We have allowed extra money for clerical help and the travel expenses of our Corn Belt men but we had not enough money to put on more assistants there this year. There really ought to be four more men in the Corn Belt States. Another man is needed in Texas. We find that one live-stock statistician, with an assistant, is not enough by any means to cover the State of Texas. There are two or three well defined live-stock areas there and we want a new man to put in the Panhandle area, and at the same time have him cover a part of Oklahoma. We also need a man in the western part of Nebraska and South Dakota, as well as eastern Wyoming, to help the regional man there. So we are estimating we will use about \$14,000 of this, if we get this increase, on that part of the work.

We can not undertake dairy work this year because the funds will not permit it. To start on a project of estimating milk production and changes in dairy needs would take as much more money, probably, as it would to handle the meat animals, to which we are limiting the work at the present time. An increase of \$11,000 is asked for to strengthen the Washington office. We have put one more man in this year, but our weakness, if we have any—and, of course, we all have that—is that our Washington office has not had enough trained statisticians to handle the information that comes in from the field.

Mr. ANDERSON. Do you mean you want these men to act as interpreters?

Mr. CALLANDER. I mean that we need additional men to interpret the information that comes in, to study its weaknesses and improve the methods of getting it. We need a cotton statistician in the Washington office who will help and who will study new methods of estimating cotton, which is a tricky crop and it is very hard to get good results. He will give his whole time, practically, to a study of what we have been doing in estimating and to the devising of new methods. He will also visit our various cotton States and help the field men improve their estimates, and he will also be in a position to furnish anything in the way of cotton statistics which may be needed at any time.

Mr. ANDERSON. What do you do in securing statistics and what is the difference in what you do and what the Department of Commerce does?

Mr. CALLANDER. The Department of Commerce simply reports the amount of cotton ginned. They begin in September and periodically make reports until the 1st of December. They have paid reporters who go to the gins and report the actual number of bales ginned. We begin estimating in June; we estimate the condition on the 1st of June and then on the 1st of July we estimate the acreage of cotton.

Mr. BUCHANAN. Do you not start in by estimating the acreage planted in cotton?

COTTON ACREAGE ESTIMATES.

Mr. CALLANDER. We do not make a cotton acreage estimate until about the 1st of July; that is the first acreage estimate; then we estimate the condition, and from these two factors forecast what the probable production will be; we make a production estimate about the 1st of July, the 1st of August, the 1st of September, and the 2d of October, and that is the last forecast we make. You see, nearly all these reports have been made before the Department of Commerce has begun to make ginning reports in the fall. Then a final estimate is made in December, about the 12th of December. We have been accumulating data for several years with a view to making another forecast in November, and I think we now have sufficient data to begin this coming year to make one more additional cotton forecast in November of each year. There has been quite a demand for that because there is quite a gap between the estimate made on the 2d of October and the final production estimate will be in December.

Mr. ANDERSON. I understand it costs about \$270,000 to get these cotton ginning statistics. Do you think you could do it any cheaper than that?

Mr. CALLANDER. Well, I think we have the machinery and that we probably could if it were given to us.

Mr. BUCHANAN. The most of that is paid out in wages to the cotton statisticians in each county, is it not?

Mr. CALLANDER. I think so.

Mr. BUCHANAN. Have you anybody now employed who could take up that work without much extra expense?

Mr. CALLANDER. We have men in every county and I think we could probably arrange to get it. Of course, we have a head man—a statistician—in each State who is familiar with conditions in his State, and we get that sort of information from other sources, that is, not on cotton, but we get similar information on some other products by getting reports direct from the people who are doing the work through our State statisticians. As it is now, the ginning reports are, in a way, a check on the other, and it is very desirable to have not only an estimate of what the probable production will be, but a report of the actual amount ginned. We have estimated that we could make the ginning reports for about \$100,000.

Mr. BUCHANAN. When you make your estimates after the ginning statistics come in you have those ginning statistics to take into consideration in making your estimates?

Mr. CALLANDER. We only have them for one report and that is the December report. At that time we do take into consideration the ginning statistics, because the crop is pretty well ginned by that time, as a rule, and this year a great deal of it is ginned.

In addition to this cotton statistician we want to put a grain man in the office who will specialize on grain statistics and methods of estimating wheat and corn. Up to this time we have only had Mr. Murray, the chief statistician, and one other man, as statisticians in the Washington office. The information comes in from the field and it has to be rushed through, and there has never been enough trained people in the Washington office to properly handle the material. We want, if possible, to strengthen the Washington organization by putting in at least two more statisticians than we have at the present

time, and we feel that the results to the whole service will be very beneficial.

I have already mentioned the fact that since the amalgamation of the bureau with crop reporting the machinery, the field men and the volunteer correspondents, are now being used for other purposes as well as crop reporting. We are not using the same people, but we are building up lists of men who report only on special subjects because we do not want to overburden our regular crop reporters.

MARKETING STATISTICS.

Doctor TAYLOR. Mr. Tenny will discuss the item relating to marketing statistics.

Mr. TENNY. This is the item I mentioned yesterday as being transferred from the marketing and distribution funds last year, \$23,400. This is used exclusively in the compilation of fundamental marketing information. It includes holdings in cold storage; it includes the movement of cars from shipping points, and some price information as to the various commodities.

Mr. ANDERSON. Do you get figures yearly, weekly, or monthly as to the loads and unloads of fruits and vegetables?

Mr. TENNY. In the larger cities we get daily reports as to the loads and unloads of fruits and vegetables.

Mr. ANDERSON. That information, I imagine, gives you a fairly good index?

Mr. TENNY. Yes; it does. In addition to that we have cold-storage reports on 35 commodities. To show the completeness of these reports, we are circularizing monthly 1,206 cold-storage plants.

Mr. ANDERSON. Do you include public and private cold-storage plants?

Mr. TENNY. Yes; 1,191 of the 1,206 are giving us replies monthly, leaving only 15 out of 1,200 that fail to reply, so that we feel our storage reports should be very nearly accurate.

Mr. ANDERSON. Are these reports ever checked up?

Mr. TENNY. Through personal visitation?

Mr. ANDERSON. Yes.

Mr. TENNY. Occasionally an individual one, but not universally so. The man who has this in charge is right now making a visit to six or eight of the larger cities for the purpose of getting in touch with these cold storages and finding out how well their reports are made. Of course, that does not mean that he goes into a storage house and makes a count or goes through their books, but he is endeavoring to get the attitude of the people who are making the reports, how they are making them and the data from which they draw off the reports. We are also making cold storage reports on fish. One hundred and ten concerns are on the mailing list and the average for the last six months has been 107 reports, leaving only three that have failed to report.

We are making cold storage reports on apples, butter, cheese, eggs, fish, ice cream, lard, live stock, live-stock slaughters, cold storage holdings of meats, condensed and evaporated milk, oleomargarine, and the cold storage holdings of poultry, as well as quarterly reports on wool. We are handling a portion of the wool reports, the remainder being handled by the Department of Commerce, and we are

issuing a joint report, the work being done cooperatively. This information, in the main, is published as straight statistical information, and we are having a greater call than ever before for the bare statistics. However, we do some tabulating and analyzing of these reports, and quite a large number of mimeograph reports are issued with a brief summary of the situation in comparison with previous months and previous years. I think there is nothing further on that item that I care to mention.

FOREIGN MARKET INVESTIGATIONS.

The last item in this appropriation is that relating to foreign competition and demand. This year we have \$65,000, which is handled, as I recall, as a proviso. That is true, Miss Clark, is it not?

MISS CLARK. Yes; it is a proviso to the appropriation for crop and live stock estimates.

MR. TENNY. We have requested a change in the proviso, that is, to make \$80,000 available instead of \$65,000. The work connected with foreign competition and demand is exactly what is covered in that heading and naturally divides itself into two lines of work, foreign competition and foreign demand for American products. At the present time we have five regular men in the foreign field. Mr. Foley is in London, where he is in touch with representatives from the whole of the British Empire. In addition to keeping in touch with the developments in the British Empire Mr. Foley has made several other studies. Last year we had a request from the almond industry for information regarding competition in the almond industry and this mimeographed circular report was gotten out. We have in the files a number of letters from the almond association of California commenting most favorably on that report and telling us it is just the information they want in shaping up their industry and their sales policy. Mr. Squires is now in Germany. In Germany we are studying the development and comeback of the live-stock industry there, with especial reference to the relation of the German live-stock industry to lard substitutes. Germany was one of the largest buyers of lard before the war and we are now studying, in a rather critical way, the lard substitutes that are being used in Germany, with especial reference to the question of demand for our own products.

MR. ANDERSON. How is this foreign work organized? Do you have representatives in the foreign countries who stay there the year around?

MR. TENNY. These I have mentioned are in the foreign countries most of the time, but not necessarily in any one country. Mr. Squire was originally in London. Mr. Squire was in the English countries with Mr. Foley, and when the need arose for making a study in Germany we sent Mr. Squire to Germany. He will also go into Poland and cover a number of those central European countries in making the special studies we want made. Mr. Michael is still in eastern Europe, in the Balkan countries, and has been making a very careful study of cereal production. We have this month, November, issued a report on cereal production in Yugoslavia, and that report indicates the character of the studies these men are making. Mr. Bullock is still in Argentina, but will return very shortly to the

Washington office. Mr. Bullock has been studying particularly the statistical work in Argentina, with the idea of getting better statistics out of that country, which are very important from our standpoint, as it produces much of the same products we are producing and those products come in competition with our agriculture. He has also been studying the live stock industry in Argentina to a considerable extent. Just recently we have sent Mr. Lively to Manchuria.

Two things are particularly in our minds in this work in Siberia and Asia. First we want to get a clear picture of the competition that is coming from there on cereal production, and then we are proposing that he shall go over into certain parts of China to study the cotton production in that country. Something over 1,000,000 bales of cotton enter into commerce from China, and it is our desire to know more about where this cotton is produced, the conditions under which it is produced, the labor conditions that make the crop and the whole economic aspect of the production of cotton in China.

Mr. ANDERSON. What I would like to know is whether that is something which will become a mere matter of history and which can be embalmed in some library, or has it some relation to what we are doing?

Mr. TENNY. Through our press service these reports are being given the very widest distribution and they are angle from the point of view of being of assistance to American agriculture to-day and in the future, but primarily with regard to the development of our agricultural policy for the future, because if China has the possibilities of producing a certain type of cotton and not another particular type that fact is of very great importance in all of our agricultural work in developing the cotton business in this country. I am using that simply as an illustration. The review I have given covers the work of individuals. In addition, we are getting a great deal of statistical information direct from the countries, analyzing it and issuing it in connection with the crop reporting information. We feel it is just as important, with the channels of trade open as they are now, for us to know what is being produced in foreign countries and what is being done with it as it is to know what is being produced here and what is being done with our home production. So all of these men and all of our correspondents are working from the angle of being of the greatest benefit, from the statistical point of view, to our agriculture.

Mr. ANDERSON. What is the situation now with reference to securing prompt statistics of European production and consumption? My recollection is that those statistics have come in as a rule six months or a year after they could have been of much use. I am interested in knowing just what is being done with a view to getting those statistics more promptly.

Mr. TENNY. The statistics of crops and live stock and live-stock products that we are able to gather from initial sources are cabled, and are handled just as expeditiously as our own crop and live-stock reports.

Mr. ANDERSON. Do they come directly from the country concerned?

Mr. TENNY. Yes, sir; we are getting them that way, and we are also getting them two weeks or so later from the institute at Rome. We have a number of other reports. We are issuing weekly this

Foreign Crop and Markets, which is a mimeographed circular that summarizes the information that comes in during the week from foreign countries.

Mr. ANDERSON. How does that connect up with what the Department of Commerce is doing?

Mr. TENNY. My impression is that it does not conflict at all with what they are doing. This is wholly supplementary to anything that they may be doing. This is the angle, as I have stated before: It is done from the viewpoint of being of the greatest assistance in shaping our own agriculture, and is necessary in order to develop the correct agricultural practice. Here is a report from Mr. Squire on the question of Danish bacon displacing the American product in British markets. This report is issued by Mr. Foley on the British apple market, and it has been used by practically all of the apple exporting concerns of this country as the very latest information on the British apple market.

Mr. ANDERSON. How many people have you in your division?

Mr. TENNY. There are five or six scientific people and 12 clerks working on the problem of analyzing this material that is coming in from foreign countries and getting it out from week to week so that it may be useful.

Mr. ANDERSON. How many people have you in foreign countries?

Mr. TENNY. There are five.

Mr. ANDERSON. Are they all in Europe?

Mr. TENNY. No, sir; there is one in Asia, and one in South America. The others are in Europe.

FOR MARKET INSPECTION OF PERISHABLE FOODS.

Mr. ANDERSON. We will take up the item on page 281, for enabling the Secretary of Agriculture to investigate and certify to shippers and other interested parties the quality and condition of fruits, vegetables, poultry, butter, hay, and other perishable farm products.

Mr. SHERMAN. Mr. Chairman, we have here an estimated increase of \$100,000, which it is proposed to expend in the following proportions: For the inauguration of hay inspection work, \$40,000; for poultry and eggs inspection work, \$8,000; and for further work in the inspection of fruit and vegetables, \$52,000. The hay work will be entirely new. The appropriation, however, for the last three years, I think, has carried authority to inspect hay along with those other products, but no addition was made to the amount carried in the appropriation and no hay inspection work has been done.

HAY INSPECTION SERVICE.

Hay standardization work has gone forward, as Mr. Tenny explained to you, under the marketing and distributing item, or through an allotment from that item, and now the department is in a position to go ahead with the actual inspection work. The hay exchanges of the country have taken a most lively interest in the work, and apparently have been entirely converted to the idea. They now have men in training with the department who are to be used as inspectors to be employed jointly by the hay exchanges and the department. They are to be employed under the supervision

of the department in the application of the recommended grades for timothy and clover mixtures.

Mr. ANDERSON. Will any charge be made for those inspections?

Mr. SHERMAN. Yes, sir; a charge will be made for the inspections, but how nearly it will come to making the work self-supporting, we can not tell in advance. It will have to be tried out. We will have to experiment with that as we go along, just as we did in the case of fruits and vegetables. As you will remember, the fruit and vegetable inspection work during the first year was a free service. In connection with the fruit and vegetable work, during the fiscal year ended June 30, 1919, 14,493 cars were inspected, and no charges were made until October of that year. Then we began with a fee of \$2.50 per car, and that fee was continued through the next year, or the year ended June 30, 1920. During that year 25,488 cars were inspected at a fee of \$2.50 per car. Then the fee was raised to \$4, and the interstate limitation was put on by Congress. Then the number of inspections dropped to 23,877. Then in the fiscal year ended June 30, last, the inspections went up to 31,207, at a fee of \$4 per car. Therefore, as you will see, we have progressed from no income at the beginning to a point where we have returned to the Treasury in the last fiscal year \$128,627 out of an appropriation of \$175,000, making the service about five-sevenths self-supporting. We are running at just about the same rate this year in our work in the cities. That is a digression from the discussion of the hay work to a discussion of the fruit and vegetable work.

Now, the same policy is to obtain in the hay-inspection work that has obtained in the fruit and vegetable inspection work—that is, to start with fees that the people will pay and then work it up as nearly to a self-supporting basis as possible. When we come to the question of the inspection of fruit and vegetables, I would like to go into that matter further, and see whether the committee has the idea that we should raise the fee so as to make the work entirely self-supporting, or until we reach the point where the decrease in business balances the increase from higher fees, or whether we should aim to keep the work popular, even at the expense of a small part of the appropriation. It is a question right now whether we should raise that fee to \$5. If the fee had been \$5 last year, and if we had had the same number of inspections, we would have been only \$15,000 short of turning in the full amount of the appropriation to the Treasury.

Mr. ANDERSON. If I understood Mr. Tenny correctly, those hay standards are still in a somewhat experimental stage.

Mr. SHERMAN. They necessarily are in an experimental stage until they reach the stage of demonstration in actual practice. The hay associations of the country have generally accepted and approved this proposition, and wish to put their business upon the basis of the recommended hay grades, so far as timothy and clover mixtures are concerned. Most of the work remains to be done with reference to prairie hays and alfalfa, so that the hay-inspection work contemplated under this item will be confined very largely to the Eastern cities. The men actually in training now are expected to work in Boston, New York, Philadelphia, and Richmond, Va., with one operating here in Washington, who will be available for inspection work at Washington and in Alexandria, where the hay laboratory is located.

Mr. ANDERSON. Will you have any hay inspection at Kansas City?

Mr. SHERMAN. I presume it will reach Chicago, Kansas City, and Cincinnati before the end of the fiscal year if this money is appropriated. However, there has been some question as to whether we should have hay inspection at Kansas City until we are ready to inspect prairie hay and alfalfa.

Mr. ANDERSON. How do you arrive at that \$40,000?

Mr. SHERMAN. That is purely an estimate.

Mr. ANDERSON. Is it just a guess, or do you have any idea what you will do with it?

Mr. SHERMAN. We have a pretty good idea of what we would like to do. I believe that Mr. Wheeler will handle the details of that work, and he is not here. I think that the \$40,000 will take care of the work in Boston, New York, Philadelphia, Washington, and Richmond, Va., and also at certain shipping points in New York State, where State funds can be used in cooperation with us in making this service available at the shipping end. It may also be used in Cincinnati, Chicago, and Atlanta. Now, I am not ready to commit the department to the statement that the work will be carried on in all of those cities during the entire fiscal year on this \$40,000, because it would seem to me that that would be more than we could reasonably hope to carry out, but those points I have mentioned are points where we expect to begin work, and it will be done pretty nearly in that order, so far as the money will go.

Mr. ANDERSON. I think you had better furnish us with a statement showing where you propose to put those men, what salaries you will pay them, and when you expect to put them on.

(The statement referred to is as follows:)

Estimate covering hay inspection.

Salaries:

| | |
|--|----------|
| 1 chief inspector (headquarters, Washington, D. C.)..... | \$3, 500 |
| 3 supervising inspectors at \$3,000 (1 at Washington, D. C., to cover eastern markets; 1 at Chicago to cover the Middle West; 1 at Atlanta to cover the South)..... | 9, 000 |
| - 1 inspector (Kansas City)..... | 3, 000 |
| Clerical assistance (temporary clerks as needed)..... | 2, 700 |
| 30 inspectors on cooperative basis at following points: Boston, New York, Philadelphia, Baltimore, Washington, Richmond, Pittsburgh, Atlanta, Jacksonville, Birmingham, Chattanooga, Nashville, Memphis, New Orleans, St. Louis, St. Joseph, Louisville, Cincinnati, Columbus, Ohio, Indianapolis, Chicago, Milwaukee, Omaha, Minneapolis, St. Paul, Duluth, shipping points in New York and Virginia, and also in Ohio, Indiana, and Michigan, if possible..... | 10, 500 |
| Stationery and office supplies..... | 1, 000 |
| Telephone, telegraph, freight, express, drayage, etc..... | 1, 750 |
| Traveling expenses..... | 5, 160 |
| Rent of office space..... | 1, 500 |
| Scientific and other equipment..... | 1, 500 |
| Miscellaneous items..... | 390 |

40, 000

If this appropriation is granted, arrangements will be made to start men in training for inspectors on July 1, and within six weeks of that time, the department will be ready to get the service under way in all of the cities shown above.

Mr. SHERMAN. There are five men in training now.

Mr. TENNY. The only arrangement that will be made until the 1st of July will be to put these men in at \$1 per year, which is simply a nominal salary arrangement, because we have no funds. After

that time, if the funds are available, we would like to pay them not less than \$100 per month, and in some cases it will be a little bit more than that. All of them will be cooperative men.

Mr. ANDERSON. That is, partly paid by States?

Mr. TENNY. In some cases partly paid by States and in some cases partly paid out of inspection fees that are collected by hay exchanges.

Mr. ANDERSON. I do not see how you can charge an inspection fee on the side of the Government where the men are partly paid by the Government and partly paid by the States.

Mr. TENNY. The way it is handled is that the fee will be charged and collected through the hay exchanges, and the part of the salary that is not paid by the Federal Government will be paid out of those fees. In addition to the amount that will be paid these men out of the fees, a part of the fee will also come to the Federal Treasury to cover the approximate cost of the service to the Federal Treasury. We will have to pay our proportion of the salaries out of the appropriation, but out of the fee will come into the Treasury an amount approximately equal to the amount paid from the Treasury.

Mr. SHERMAN. Of course, if such agreements are made, you can provide for the reimbursement of the Treasury with much more accuracy than from the fees, which, in turn, are dependent upon the flow of business. We have a rather profitable arrangement that I would like to explain to you a little later with reference to shipping-point inspections of fruits and vegetables, in which the States guarantee to us a return of the salaries that we have to pay.

POULTRY AND EGG WORK.

It is the purpose to allot \$8,000 of this increase to poultry and egg work. Mr. Tenny has spoken to you with regard to the progress that has been made in the development of egg standards. The people who are handling the poultry and egg work realize that it is of very little use to recommend egg standards or grades unless you are ready to put on the inspection service and demonstrate whether or not they are being used and lived up to. If you simply recommend certain grades, they will be adopted in both the western markets and the eastern markets, but you will still have those questions and differences of opinion between shippers and receivers until you put on Federal inspectors. Therefore it is expected that if this increase is granted about \$8,000 of it will be used for poultry and egg work. That work will be done in the big cities, like New York, Boston, Philadelphia, and Chicago. In New York City, we will say, there will probably be a certain number of inspections of live poultry. They will have the same old questions that have been agitating the poultry trade, of the overfeeding of poultry before putting it on the market. They are still having a great deal of difficulty with that, and they want Federal inspection to determine whether or not poultry arrives in a proper condition to be placed upon the market.

INSPECTION WORK IN FRUITS AND VEGETABLES.

Out of the \$100,000 increase asked for, it is proposed to allot \$52,000 to the expansion of the inspection work in connection with fruit and vegetables. I have just reviewed the work to date. As it has been handled in the past, the inspections have grown from

14,000 cars in the first year up to 31,207 in the past year, or in the year which ended on June 30 last. The city work is running just about the same, or at the average rate of last year, for the few months we have passed through of this fiscal year. The only new work that has come on us in the cities is the inspection work that we have been asked to do for the Army and Navy hospitals in the vicinity of the port of New York, and we are now just completing an arrangement to inspect all the fruit and vegetable supplies for the fleet under the control of the Shipping Board, which will involve the employment of one or two additional men in New York. However, they will be paid for by transfer of funds from the Shipping Board's appropriation to ours, just as is done in the case of the work that we do for the Navy. We have eight men now giving full time to the inspection of supplies for the Navy, and the salaries of those men are reimbursed to us by a transfer of funds from the Navy appropriations to ours. For that reason, if you look at our pay roll, it might appear that we are carrying a rather large force for the amount of inspection work we are doing, but a number of those men are really being paid by the Navy, and they constitute no drain upon this appropriation.

Just at the present time there is an extra demand in the port of New York on the part of exporters for the inspection of commodities going abroad, particularly of apples, which work we have not been able to do, because of our inability to put on any more men. The inflexibility of the service is a very serious handicap in some respects.

Last year, as you are aware, the House amended the language of this item, providing that inspections might be made of those products when offered for interstate shipment, or when received at such important central markets as the Secretary of Agriculture may from time to time designate, etc. I am not sure whether the committee realizes just what they did to us when that change in language took place, or whether they thought they would multiply our field by 10, 20, or 100. As a matter of fact, you multiplied our field very nearly one hundredfold, but as you know, there was no increase made in our appropriation to meet it. Therefore, we have had the delightful outdoor sport of seeing how many bricks could be made without straw. You may be interested to know that from the 1st day of July to the 15th day of November we had inspected at shipping points 35,900 cars of fruit and vegetables, of the aggregate value of something over \$24,000,000. That is to say, we had inspected more cars at the shipping points between July 1 and November 15 than we had inspected in the course of the entire preceding fiscal year.

Mr. ANDERSON. How did you do it?

Mr. SHERMAN. On the 11th day of June I started myself on a tour of the State capitals, visiting the commissioners of agriculture and the people who have authority to do those things in the States, and also those who have some money to spend, and especially those who have authority to use the money that they may make in such enterprises. I was fortified by a series of opinions from the solicitor's office as to what sort of bargains we could enter into under that item. I had a series of conferences with commissioners of agriculture, the market men in the States, and a good many with the attorneys general of the States, to see how we could fit the State law into the Federal law and work up a cooperative agreement under which this

work could be done. In some of the States they had unexpended balances in their agricultural appropriations that they were glad to put into this work as a matter of experiment and as educational work. They were willing to do that whether they could get the money back or not, and in those cases that was the measure of the amount of work that could be done. In other States they were already operating inspection services, and they had authority to use fees for the support of such work. In those States we had a relatively simple proposition.

We worked out agreements with 18 States. Some of them have operated for a few months, or until the State money was gone, and some of them will operate throughout the fiscal year. As I have said, we have 18 cooperative agreements with States for shipping point inspections, and in many vital particulars absolutely no two of those agreements are alike.

Every one is different from any other—that is, as to the method of making application of the funds, the division of the money, the method of employing the men, etc. However, in every case we held to two or three basic principles. We have held in each case that a reasonable fee must be charged and collected, approximately sufficient to cover the cost of the service rendered. We have allowed the States that wanted to put money into it to fix the fees, and in some cases they have put in a scale of fees that would not make the work self-supporting, but in those cases the States were willing to invest a certain amount in it for educational purposes. We have also insisted that the inspections should be on the basis of United States grades, and that the form of statement concerning any matter of grade should be a form that we approved.

We hope next year to bring about an almost absolute uniformity in the form of the certificate and in the nature of the statements made, and we expect to do that by having all of the certificates printed here at the Government Printing Office. They will be printed in such manner that each State can run in the State name under that of the Department of Agriculture, with sufficient room alongside the citation of our authority for them to cite the State authority.

Mr. ANDERSON. How is the certificate signed?

Mr. SHERMAN. It is signed by the inspector, who states that he is authorized by the acts cited to inspect and certify both on the part of the State and of the United States. He holds a license card signed by the Secretary of Agriculture and countersigned by myself, or by the supervising inspector, authorizing him on behalf of the Secretary to inspect under this act. Therefore, all of those shipping-point certificates are joint State and Federal certificates. Where no one in the State has authority to do this work, we can not operate, because we have no money. We have the authority but have no money. If anybody in the State has the authority and the money, we can cooperate with them.

Mr. ANDERSON. How are those shipping-point inspections carried out? I suppose that in the case of many commodities it is a seasonal proposition.

Mr. SHERMAN. Yes, sir; in some cases it is seasonal, and there will be no occasion for the work except during a few weeks or months. In those cases there will be no permanent State organization to handle it.

Mr. ANDERSON. Where you have shipping-point inspections, do you inspect everything that goes out of a certain point, or what kind of arrangement do you have for that with the shippers?

Mr. SHERMAN. This is inspection at request, with certain exceptions. For instance, the State of Colorado has passed a law in which it is made the duty of its bureau of markets to inspect every carload of fruit and vegetables going out of the State, except in cases where for business reasons they can not reach the commodity, and then they must issue a release so as to clear the shipper if it is shipped without State inspection. The Colorado law does not prescribe what a man may ship or what he may not ship, and it does not prescribe any grade that he must conform to, but provides that he must have the inspection made and the certificate put in the car showing the result of the inspection. For the purposes of this inspection, the State bureau of markets has adopted all the grades we have recommended for fruits and vegetables, and they have drawn up their own where we have not made recommendations.

Now, the law having required the State agency to do this work, we recognize the State as an interested party with reference to every shipment of fruit and vegetables made out of the State, and our agreement with the State bureau of markets in Colorado provides that we will jointly with the State, and at its request, made a Federal inspection of every car of fruit and vegetables that the State agency inspects. The State authorities have divided up the territory into six districts, under six supervisors.

Mr. ANDERSON. Do you mean by that that you have two inspections made?

Mr. SHERMAN. The same man makes the inspection, and there is only one inspection. There is one operation and one certificate is issued. In that case legally we do not know the shipper at all, and we only know the State of Colorado. The shipper must submit to the inspection and the shipper is delighted to have the Federal certificate added to the State certificate, which he must accept and pay for.

Mr. ANDERSON. I should imagine that it would be a pretty expensive proposition to make an inspection of every carload of fruit and vegetables shipped from the State of Colorado. Are those cars concentrated at gateways?

Mr. SHERMAN. No, sir; they have a complete system covering the entire State. They have divided the State into six districts under six supervisors. Out of the fees that they collected last year from this service they sent the supervisors of those six districts to Chicago, and we gave them there our regular course in inspector training, say, for a month. Then we made them cooperative employees under the State law. Unfortunately they could only be paid \$1,500 a year, and it is not to be expected, of course, that they can hold good men at that salary. Therefore we made those six district men cooperative employees and added \$300 a year to their salaries. We made them United States food products inspectors under the law and authorized them to inspect commodities received in their markets, just as our men do in New York and Chicago. For instance, they can make inspections of shipments coming into Grand Junction from points outside of the State. In that connection, we were able to

reestablish the Federal inspection at Denver, which we had to take out of the State after the war. Therefore, as I have said, we have those six well-trained men, and under them there are inspectors who are inspecting the cars from day to day. Those six men are traveling over their territory all the time. The local inspectors under those men inspect practically all the fruit and vegetables that come out of Colorado and issue United States certificates along with the State certificates.

The State pays us as our share of the fee collected 25 cents per car. The State of Colorado has inspected, or we have inspected jointly with the State of Colorado, between the 1st of July and the 15th of November, 13,342 carloads, or a little more than one-third of the total shipping point inspections in which we have participated have been right there in the State of Colorado. The State, having statistics of the shipments over a period of years, knows just about what it has to do, and can apportion its men in such a way that they can handle the work. They can take men on and drop them off so as not to have a large idle force. They have adopted fees running from \$3 per car on potatoes up to \$5 on boxed fruits per car. On that scale of fees, the work is entirely self-supporting, and the 25 cents per car that they pay us returns to the Treasury just about twice the amount of money that we are putting in the State in the way of contribution to the salaries of those supervisors. Therefore, we will come out of the shipping point inspection work in Colorado with about from three to five thousand dollars a year above our expenses.

Mr. ANDERSON. Under this increased appropriation, then, you would continue to make cooperative arrangements with the States?

Mr. SHERMAN. To some extent. Let me explain another cooperative arrangement that we have with the State of California, where the work is entirely voluntary. There is no State law requiring anybody to submit to inspection, although that is not exactly true with reference to apples. They have a special mandatory law with reference to apples, which makes inspection almost compulsory, or the shippers think so anyway. Generally speaking, the inspection in California is on a purely voluntary basis, and the State is out soliciting business all the time for its inspection service. In California, by the way, we inspected 9,407 cars between July 1 and November 15, that being the second largest number of cars inspected for any State. In California we also have an agreement that our share of the fee is to be 25 cents per car. That State will make no inspections without the participation of the Federal Government, and we have made three men in California cooperative employees and have contributed to their salaries. One of them is the chief of the bureau of standardization of the State department of agriculture, and he represents us in the supervision of that work.

Basically, that is not a desirable arrangement, and we should have a man who is a full time and full salaried Federal man representing us in California in the supervision of that work, and working jointly with the State men. The State men, of course, should be paid entirely by the State.

It is not a healthy arrangement to have the Federal supervision in any territory entirely in the hands of a man who receives the major

part of his salary from the State. I think you will agree with me that that is basically undesirable, and an arrangement can just as well be made to provide for full-time Federal men and at the same time return to the Federal Treasury a proportion of the fees which will take care of the portion of the cost that we furnish in the way of salaries.

My idea is, if we are given this increase of \$52,000, to hire out of that at least 10 or 12 men who will be, on the average, about \$3,000 men, and who will be used as supervisors in the shipping-point inspection work. One of them may be employed in the Gulf States for two or three months during the shipping season, and then taken off there and sent to West Virginia and Ohio. It can be so arranged that a man can work in three or four States in the course of the year, but he will always be serving on a full salary as a Federal supervisor in charge of the work, and always answerable to us. I can see no reason now why we can not return to the Treasury fully as large a proportion of this \$52,000 as we are now returning of the present appropriation, and I should hope to do a little better than that.

INSPECTION POINTS.

Mr. ANDERSON. To what extent is use being made of this new language authorizing inspections at points which may be conveniently reached?

Mr. SHERMAN. We simply notify the trade in all of those cities that there is no longer any limitation as to places, and that our inspectors will go anywhere within a day's journey of the places where they are located when they are wanted. We make it a general rule that the inspector will not go so far away from his post as to keep him overnight. In several instances it has been necessary to send a man out from Chicago, for instance, on work that will take a longer time than that, but, as a general proposition and as an administrative matter, we say that they may go anywhere within a day's journey of the places where they are located.

Mr. ANDERSON. Is there considerable inspection work of that sort at points away from the designated points?

Mr. SHERMAN. There is a good deal of it in the aggregate, but it is fairly well concentrated, I would say. For instance, the Atlanta man seldom goes out of Atlanta, but the Cleveland people often go to Akron. The Detroit inspectors go to Toledo, and the Toledo people are exercised over the fact that they have to pay the carfare of the inspectors from Detroit down to Toledo and back again. The New York inspectors make inspections all around New York, and up into Connecticut particularly. The Chicago office also makes a good many inspections outside of Chicago.

Mr. ANDERSON. Do you have any inspections made of shipments out of the larger cities as well as inspections of shipments in? For instance, at Chicago, do you have shipping point inspections of shipments out of Chicago as well as inspections of shipments coming into Chicago?

Mr. SHERMAN. I do not think we have had much of that this year, but we have had that sort of inspection work at Chicago in two or three past seasons of Wisconsin cabbage coming into Chicago and being stopped there for inspection, and then being sold in the South

on the basis of the inspection at Chicago. We inspect a great many onion sets also in Chicago. There seems to be large quantities of onion sets produced in the areas close to Chicago, and they are shipped out through Chicago houses that handle them. For that reason we have a good many onion set inspections to make there.

We had cooperative agreements, for the inspection of potatoes only, with the States of North Dakota, South Dakota, and Montana, each of those States having a certain amount of money available in their agricultural appropriations with which they were anxious to secure inspection work, largely as educational work, as well as a service work. In each case, the service was offered until the State money was gone, and then it was dropped. For instance, in North Dakota we inspected 222 carloads of potatoes, in South Dakota 306 carloads of potatoes, and in Montana only 70 carloads.

The machinery was set up, but, as you realize, this year has been an exceptionally hard year in which to support a thing of that sort in the case of potatoes, because everybody had to consign his potatoes, and, of course, the man who consigns his potatoes does not care much about the inspection of them, because he knows that when they get into the market the buyer will form his own judgment regarding them anyway.

In normal years, I think, the potato inspections at the shipping points would be by far the largest single item, as potatoes are by far the largest single item in the market. This year, outside of Colorado, where everything has to be inspected, I presume the inspection of apples will run almost as heavy as the inspection of potatoes, although in Idaho, where the inspection work is entirely voluntary, we have inspected over 6,000 cars of fruits and vegetables, more than half of which consisted of potatoes.

Mr. ANDERSON. When you inspect a car of apples, do you open all the boxes?

Mr. SHERMAN. No, sir; all of the inspections are made by sample. Usually in a car of apples that will mean about 10 boxes if they are of one variety and size, but if you have four or five different sizes in a car, or four or five different varieties in a car, we have to inspect the usual run of samples for each size and for each variety before we can issue a certificate covering the car.

In the case of a carload of sacked potatoes, the rule is to inspect as many as eight sacks, and if from that inspection we find the condition running fairly uniform, we will assume that we have the average of the car—that is, provided we have taken the eight sacks from all parts of the load. If we find an irregular condition in the potatoes, we go a little further. When we find a range of as much as 12 per cent between the best and poorest sacks of potatoes in a car, we do not certify that as a first-grade car, but we say it is an irregular car. We may say, "A majority of the sacks up to grade, with some showing 15 per cent defects," or we may say that they do not meet the requirements of the United States No. 1 grade on account of the excess of defects. We may say that they run from 3 per cent to 15 per cent defective, or mostly 12 per cent defective, or something like that.

In New York we had a situation in which the State thought that they could put up about \$2,000 to do this work. They were to employ three men, and we were to furnish a supervisor. The fees were divided between us, we taking 50 cents per car and taking chance

on what it would amount to, letting the State take the other \$2.50. One of the points at which inspection was offered was Avoca, and I have here a letter from Gledhill & Putnam (Inc.), who handle potatoes for an association. They are writing particularly about a car on which they had a reinspection. I want to quote two paragraphs from the letter, as follows:

Just so long as you are favoring the members of our potato association with inspection service, we want every car of potatoes which we load inspected. In fact, our receivers are placing their orders with us with instructions to send inspection certificate with the invoice, and the time is near at hand when we will be unable to make such deals until we can furnish the Government inspection certificate.

In other words, the buyers are rapidly becoming educated to know what that inspection service means, and they place their orders accordingly. The last paragraph of the letter reads:

We understand that there has been no provision made for inspection service in this territory after January 1, and we want to say to you that it is the idea of our association that curtailment of this service is bound to work a severe hardship on us, for, contrary to the usual procedure, our crop has not moved in the fall as it should; rather, there is a large crop of potatoes to be handled here, and it is our opinion that this stuff will all move after January 1, and then more than ever will we require the inspection service.

That is exactly the situation in North Dakota, where everything is full that can be filled with potatoes, and that big movement is coming on after the State has expended all of the money that it has for the work by putting on 10 salaried men. In other words, the money is gone, while the business is there, and there is no way by which those fees can now be collected and the expenditures recouped. In Colorado, California, Idaho, and the State of Washington where the work is supported by the fees collected, we have sufficient elasticity to take care of the business as it comes. Of course, that would be a thoroughly satisfactory situation in places where we have a personnel that wants to cooperate, but in other places where the fees can not be reexpended we run right up against this situation of getting the trade educated up to the service and making the business men dependent on the service, and then having to withdraw the service. That is the only ground on which we are open to any honest criticism.

Congress has asked us to go into this business and to render a business service. This is a service that can be sold like life insurance, but you must show that it is a good thing. After the business man is shown that it is a good thing, he wants it. Then the business men begin to build up their business upon the basis of this inspection service. Then if the condition of the market is such that it becomes easy to sell at the shipping points, it becomes exceedingly important for those people to be able to get the service.

As we are situated now, we are utterly helpless, and I think you must realize that, as a practical proposition, we must mortgage or obligate nearly all of our appropriation within the first three months of the fiscal year. We have pressure now from cities like Toledo, Ohio, Des Moines, Iowa, Hartford, Conn., San Antonio, Tex., and Wichita, Kans., where there is a demand for inspection, and they are too far from points where we have inspection service already established.

As a practical matter, we must lay out our program at the beginning of the fiscal year and provide for the expenditure of most of our money.

Then, when a situation arises like this export situation in New York, where there is a volume of business that we should handle, if we are to handle this business as we would handle a private business, or if we are to make an income when it is possible to make money, we should have the funds available. We should handle our business in just that way, so as to take advantage of the conditions, but our pay roll is such and our balance is such that we do not dare to put on two men in New York, even though they will earn a profit for the Treasury. That is in a place where we have rent already paid and where we have statutory clerks assigned, and where we have everything necessary, except the additional men to do the additional work.

This shipping point situation in western New York is duplicated right now in dozens of places all over the country. Men say to us, "We are ready to pay for this service." They ask, "What do you do with the fees?" We can only say to them that we put them in the Treasury, and if we tell a good enough story to the committee they may add something to the fixed amount that we can spend next year.

Mr. ANDERSON. We seem to be keeping pace with you as it is, as nearly as I can figure it out.

Mr. SHERMAN. I do not think we can find fault with the way the committee has treated this project. We are placed in a situation where we have to compete with private agencies. We have private agencies competing with us all the time, and we have had a private agency to take some railroad business away from us this year. Last year it was our service, and we inspected 5,196 cars in Philadelphia last year.

Mr. MAGEE. What did you charge for that inspection?

Mr. SHERMAN. \$4 per car.

Mr. MAGEE. What does the private agency charge?

Mr. SHERMAN. The private agencies will charge whatever price they have to make in order to get the business under contract. We were offered the business of one of the large railroads.

Mr. MAGEE. What do they charge for that service?

Mr. SHERMAN. They charge all that the traffic will bear.

Mr. MAGEE. That does not mean anything. What do they ordinarily charge?

Mr. SHERMAN. So far as I know, they have no ordinary charge. They make contracts.

Mr. MAGEE. That does not indicate anything at all. Do you know whether they charge \$10, \$25, \$1, or \$2 as compared with your charge of \$4 per car? I ask for that as a matter of information, and if you can give it, I would like to have it in the record.

Mr. SHERMAN. In some cases one agency is inspecting for \$2.50 per car.

Mr. MAGEE. What is the highest amount that you know of any private agency charging?

Mr. SHERMAN. I would not like to quote anybody because we are dependent upon somebody's word for it.

Mr. MAGEE. You have a pretty good idea of it, have you not?

Mr. SHERMAN. There is a man inspecting at Minneapolis—

Mr. MAGEE (interposing). What is the maximum charge that you know about and what is the minimum charge that you know about made by private agencies?

Mr. SHERMAN. From \$1.50 to \$5, where no arbitration is involved.

Mr. MAGEE. The point I had in mind was this, that under the Federal act it is provided that the certificate issued by the authorized agent of the department shall be received in all courts of the United States as prima facie evidence of the truth of the statements therein contained.

Mr. SHERMAN. If you did not give us that, we could not do any business at all.

Mr. MAGEE. With that provision in there, I do not see how you could have any competition.

Mr. SHERMAN. We get competition, because, as a practical matter, most of those controversies are not taken into Federal courts.

Mr. MAGEE. But they may be taken into the Federal courts?

Mr. SHERMAN. As a practical matter, if a man wants to bring suit, he will bring it in a State or city court, where he can get quicker action, and the testimony of the man who looked in the car door and who says that the things were all smashed to pieces will be worth just as much to him in the State or city court as the certificate that we issue would be. One advantage that the private agency has over us is that they furnish men as witnesses, and the inspector makes his inspection for the person who hires him and not as a disinterested agent. If he is hired by a railroad to make that inspection, he looks in the car, makes his certificate to the railroad, which gives the railroad all that there is to be said on its side of the case if the controversy is carried into court.

Mr. ANDERSON. I gained the impression somehow that some of these people who make contracts covering a certain large number of inspections made them as low as \$1 per car.

Mr. SHERMAN. I think very likely they do. I do not know what the private agency offered to do the work for the B. & O. Railroad for, but the B. & O. Railroad practically offered us a guaranty of 80,000 cars a year in Philadelphia and New York if we would make a substantial reduction in the fee. They expected to get it done for \$2 per car or less. We understood that this private agency had offered to inspect 80,000 cars at Philadelphia and New York for \$1.50 per car. I will explain to you what sort of inspection that means. If they find out that we have inspected a car, they go in and look at our certificate, and they will always trail us. They will never make a statement which disagrees with our inspection, but their inspection is for the purpose of furnishing evidence to the person who employs them.

Mr. MAGEE. I understand that, but I view it from the standpoint of the shipper and not the transporting agency. It seems to me that with a fee of \$4 a man who exercised ordinary prudence would hardly take the chance of missing a Federal certificate.

Mr. SHERMAN. That is true. I think I am safe in saying that these private inspection agencies have almost no business from the producers and are almost never employed by a shipping association.

Mr. ANDERSON. It is practically all railroad inspection?

Mr. SHERMAN. It is railroad inspection and inspection for the receiving interests.

Mr. MAGEE. That is the way it impressed me, that you would not have much competition from the producers.

Mr. SHERMAN. No; not at all.

Mr. MAGEE. But what the transporting agency might do is another thing.

Mr. SHERMAN. We have no competition at the shipping point.

Mr. ANDERSON. I am not quite satisfied as to this hay business.

Mr. SHERMAN. May I say one more word on this matter of elasticity, although I think you see the point all right? I was going to say that it is not necessary to make all of the income from the service reexpendable in order to take care of that situation. The first \$10,000, \$20,000, \$30,000, or \$40,000 of fees could be held in the Treasury as an emergency fund, not to be drawn upon to increase the permanent salary roll but for the specific purposes which you might designate, in order to take care of work that would develop during the year.

Mr. ANDERSON. You will have to settle that with the Budget officer.

Mr. SHERMAN. Of course we never put it up to him.

Mr. ANDERSON. I think it is the policy of the Appropriations Committee, and I presume the Budget Bureau too, to oppose revolving funds. We could not do it without its being subject to a point of order any way, and I think it is a rather bad policy.

Doctor TAYLOR. Mr. Tenny will say something more about the hay situation.

HAY-INSPECTION WORK.

Mr. TENNY. All I can say is that the demand for the hay-inspection work is very strong. As Mr. Sherman has said, we have simply estimated, to the best of our ability, what it is going to cost to take care of the cities which have already indicated a desire for hay inspection work. We have estimated it on the basis of carrying a substantial portion of the salaries of the inspectors in these different cities and then have provided for from two to four supervisors, depending on the number of cities that actually take the work.

Mr. ANDERSON. In how many cities do you think you will have inspection?

Mr. TENNY. At the present time Boston, New York, Philadelphia, Chicago, and Richmond have written us, and we have practically arrived at a tentative agreement to undertake inspection work in those cities. Cincinnati, St. Louis, Atlanta, Baltimore, and Pittsburgh have been considering the matter but have not arrived at any definite decision.

Mr. ANDERSON. Then you have five cities in which you feel confident you will be able to establish it?

Mr. TENNY. Yes, sir; five cities that have assured us that they want the inspection work, and the matter has gone so far that men representing those cities have been and are in the city taking the hay-inspection course we are giving.

Mr. ANDERSON. Will you be able to get this started immediately after the 1st of July?

Mr. TENNY. Yes.

Mr. ANDERSON. We will next take up the item relating to the market news service.

MARKET NEWS SERVICE.

Mr. MARQUIS. The market news service appropriation involves no increase, as you will note, but there is an apparent decrease, due to transfer of three clerks to the statutory roll. That fund is devoted to market news projects in four principal lines, live stock and meats,

fruits and vegetables, dairy and poultry products, and hay, feeds, and seeds. The division of the fund, as shown here, is almost identical with that of the previous year, in fact, this work is going along steadily on the same general plan with the exception that in the last year there was a small increase given and a corresponding expansion in the collection and distribution end of the news service. The present statement, therefore, concerns particularly the way in which this fund is used, what this service is, what changes have taken place, and the results obtained.

In the first place, this market news service is the collection and dissemination of news concerning prices, movements of products to the markets, market conditions, and other measures of good judgment on marketing to be transferred particularly to the producer, also to serve the trade, and also inform that part of the trade which is close to the consumer. The organization involves, first, a means of collecting the information and keeping in touch with the markets.

The biggest item of expense, aside from that of its technical personnel, is the matter of communication, which is maintained by means of a leased wire service. This leased wire service is the outgrowth of the experience of the Bureau of Markets over five years, beginning, first, with commercial telegrams, later developing a special arrangement with the telegraph companies to lease a wire at half the cost of commercial rates and to utilize this wire to the maximum under the supervision of our own staff. This wire at the present time connects the principal agricultural markets, beginning with Boston on the east, New York, Trenton, Philadelphia, a connection to Lancaster and Harrisburg, Baltimore, Washington, Pittsburgh, Columbus, Cincinnati, Chicago, and Madison and Fond du Lac, Wis., Minneapolis and St. Paul in the Northwest. Then there is a southern and western branch connecting St. Louis, Jefferson City, Kansas City, St. Joseph, Mo.; Omaha and Lincoln, Nebr. Since September 1, an extension of the leased wire connection has been made to Fort Worth, Tex., and on to Austin. There is no leased wire service to any other points than those I have named; there is no connection to the Southeastern States or farther west than Lincoln, Nebr. You may recall that during the war, at the maximum expansion of this service under the emergency funds, a complete national system was laid out.

Mr. ANDERSON. Where did it go in the Southeast?

Mr. MARQUIS. Here is a map showing the maximum development on December 30, 1918. At that time there was a branch which went from Washington to Atlanta, a branch to Jacksonville and Orlando, Fla., another branch to Birmingham and Memphis, the main line passing on to New Orleans and thence to Houston, the connection between Kansas City and into Texas coming to Fort Worth only and not going on to Austin. Then on the western circuit the leased wire went west from Kansas City to Denver, to Salt Lake City, to San Francisco, south to Los Angeles, touching at Fresno and Turlock in California, with a branch to Sacramento; then in the northern loop, to Portland, Spokane, Butte, Idaho Falls, Greeley, Colo., and hitching in with the other circuit.

Mr. ANDERSON. But that service was maintained for only a relatively short time?

Mr. MARQUIS. That was maintained for about a year and a half and was discontinued when the appropriations were readjusted at the end of the war. Here is a statement which shows the amounts carried for the work. It reached its maximum development in 1919, when the emergency funds amounted to \$1,114,000, combined with the regular funds of \$254,580, making a grand total of \$1,368,580. In 1920 there was a reduction to \$497,920; in 1921 another reduction to \$403,920; then in 1922 to \$390,160, and last year there was an increase of \$20,000 to \$405,000, and then this year it is the same. The figures represented in this appropriation are \$3,600 less, due to changes in the statutory roll.

DEMAND FOR NEWS SERVICE.

Mr. ANDERSON. Is there any demand for the extension of the leased wire service?

Mr. MARQUIS. During the past year there has been a strong demand for the market-news service. As we have observed, the demand for market news is greatest when prices are low or falling. Farmers are not particularly concerned about prices as long as they are high and satisfactory. They are not searching for a market, and they are not so much interested in the choice of markets with reference to which will pay the best prices, but when prices begin to go down, then comes the call for more market information. The result is that we have had a greater call for information of this character during the past 12 months than in the past, due to the low prices. The farmers seeking markets wished to know the difference in prices at various markets, the best time to sell, and the danger of gluts; also to know the relative prices for various qualities of products. All of these things have tremendously increased the call for this sort of information, with the result that we have had frequent requests to extend this service into areas that are removed from our regular lines of communication.

Mr. ANDERSON. Is this service maintained with respect to all these various commodities—live stock, fruits, and vegetables—or only as to some of them?

Mr. MARQUIS. All of the four principal lines, live-stock meats, fruits and vegetables, dairy and poultry products, and hay, feeds and seeds, are included, and that includes a variety of reports which go all the way from the spread in price quotations to market movements, the entire range of various kinds, grades, and qualities, and any other news that bears upon the market situation.

The leased wire furnishes the most reliable means of connecting our offices for the collection of information, and I would like to show you the way that is used most effectively. On the leased wire connecting these points, which now amounts to 3,300 miles, 2,600 up to September 1 and then 700 added for going into Texas, we have 32 branch offices. These offices are in constant communication for 12 hours; 53 telegraphers are on these circuits, and messages go over these wires by code in the most condensed form possible. Here is a record showing that from 6 o'clock in the morning until 6 p. m., and every minute during the day, there is a series of code messages of various sorts going through. We make the best possible use of the time. These messages are not sent in full but in code letter and

figures which give the entire information when it is recorded on the specially prepared forms in all the offices that are on the wire at that time. This method is used in order to get as much material as possible over the wire. We are limited in the quantity of certain classes of news that we can distribute by the capacity of this wire, although in some cases during the war there were two parallel wires which could be used, or the time was extended and more operators were on duty in order to carry the news.

Now, this information goes through not in the order of commodities but in the order in which it is collected. For instance, the live-stock information from St. Paul was the first on the wire on this particular day in this record. At various times during the day there is put on the wire short code messages in order to keep the news up to date and at certain periods in the day there is a lot of market information to be sent across; consequently we have to condense in order to be able to get that material over the wire in time to be useful in the markets, where it is posted immediately and given to the traders in the markets. It is distributed also to others who are interested, either by telegraph or by radio.

The scope of these reports is increased considerably by the temporary field stations which are maintained principally by the fruit and vegetable division. In this last year there were 36 of these field stations which operated over a period of from one to seven months. These field stations were located in 25 of the various States. They had to do with the movement of particular crops in the harvest season, collecting information as to the rate of harvesting, the rate of shipment and the qualities of the goods going out, and in turn bringing back information from the general market to these shippers and informing the farmers as to general conditions. Some idea of the scope of the work of these field stations is indicated by the number of reports issued on fruits and vegetables.

In the general market stations about five and a quarter million reports were issued, and in the field stations about one and a half million reports, making altogether approximately 7,000,000 reports distributed. These reports are sent out not only in mimeograph form, which are mailed, such as these samples show, but are released at various points to the press. Our service ties together all of the various means for the distribution of news, and we have particularly had increased demands from various publications for market information and market reports. Within the past few months we have been asked to furnish to the Associated Press additional reports which heretofore they have gathered from their own sources. They tell us that the Federal Government reports are now being regarded as standard; that the public has come to regard them as unbiased and as being the best source for general market information. Therefore they prefer, wherever possible, to take our reports and distribute them rather than to collect information through their own market reporters.

DEMAND FOR RADIO COMMUNICATION.

There has also been a greatly increased demand owing to the development of radio communication. Since a year ago, when some preliminary tests were being made as to the use of radio in connection with the post office radio stations, this work has developed

until there are at the present time covering the United States some forty-odd broadcasting stations which take popular market news and distribute it direct to the people who have receiving outfits, and these broadcasting stations—which broadcast by telephone rather than by telegraphic code—in turn are rapidly developing until they can pick up the general market news which is distributed from high-powered naval stations. Through cooperation with the Navy Department we are sending from the high-powered naval stations at Arlington and the Great Lakes station at Chicago, at several hours during the day, condensed market reports which are picked up by these forty-odd stations throughout the United States, turned into telephone radio reports, and given further distribution. This map indicates the manner in which the country is being covered by radio, on a regular schedule, at the present time.

This radio communication has greatly extended the possibilities for the distribution of market news to the producer and to the small primary markets. It has not as yet proven so valuable in the collection of information, because with radio there is no chance to check back doubtful messages or to confirm any points that may need confirmation. On our leased wire, if there is anything that appears to be doubtful, the operators can easily get in touch with the sending station, confirm the message, and be sure of the result. With radio that is impossible, but for very quick service at the very minimum of cost it is unequalled. We have been able to distribute our news to hundreds of thousands of people throughout the country by means of the radio that otherwise could only get it through the expensive method of either telegraphing or telephoning. Consequently we are continuing our work in a more or less experimental way, and these experiments are relatively inexpensive because of the cooperation of other branches of the Government. The Bureau of Standards has lent its aid in the development of receiving apparatus and in tests of receiving apparatus to encourage the use of radio. The Post Office Department very generously loaned its facilities in order to make them of use. All of this radio work has been conducted at the very minimum of expense and the maximum of promise of results. There are yet many problems to be worked out, and the States are going at those local problems. All of the work being done has for its end the securing of effective distribution over certain areas.

Of all the elements of cost involved in this work the greatest, of course, is that for the technical men who gather the news. The gathering of market news involves the use of men trained in a knowledge of the particular product they are covering, whether it is live stock, fruit and vegetables, or dairy products. It involves a knowledge of grades and standards in order that they may know what they are quoting prices upon. In many commodities, which we have not yet begun to quote fully the problem is, first, to get uniform standards to apply in various markets in order to determine what is a comparable price of one market with another. Things which have the same names are not always the same things in our agricultural markets; consequently, the price of a prime article in one market is not the price of a prime article in another, so that the problem in a proper news service turns on the question of classes, names, standards, and designations; consequently this work improves as the men improve in experience and as our grade and standard

work improves, and it ties together all of the experience of the workers in the bureau.

We have in the live stock and meat news service 17 technical men; in the fruit and vegetable service about 10; in the dairy and poultry service 8, and in the hay, feeds, and seeds work 5.

Mr. ANDERSON. Are these men located in the principal markets?

Mr. MARQUIS. They are principally in the larger markets connected by the leased wire, such as Boston, New York, Philadelphia, Pittsburgh, and Chicago. They maintain offices there with men who are familiar with various lines; they go into the market and collect the reports from personal observation and issue them during the day as the reports are gathered.

The entire system is constantly being revised and adapted to the slow but steady changes in market methods. We have to meet the changes in the trade, changes which the trade often thinks are very minor and yet they sometimes have far-reaching influences. All of these offices are frequently visited and inspected by representatives from Washington with the view of changing and adapting the service. None of these reports, I might say, are fixed, but are subject to revision at constant intervals. Mailing lists are made up for the field stations, for instance, at the beginning of a season, those lists being made up of people who make application for the service. When the season is over those mailing lists are filed and are not used again, but new lists are made out for the next season. We are constantly revising our lists and sending our material only to the people who request it. In that way we avoid the waste involved in sending material to people who have no particular use for it.

One other point which I might mention is that the commercial organizations are showing a growing interest in the value of market reports gathered by the Federal department. I might cite as an instance that in one of the large live-stock markets the commission men were, up to a few months ago, each distributing once a week a market review of his own preparation, but they have recently stated that they would like to all join together and through their organization send out one market report prepared weekly by the market reporting service, and have that report coincide exactly with the Government reports which producers are receiving by radio and otherwise. As soon as this broadcasting station was developed there came a call for market news, but privately collected market news broadcasted generally and without any check upon it was regarded as of less value than a Government report which they could state in broadcasting was the official Government report, and thereby create confidence in the material that came through the air and where there was no opportunity to check back. The result is that most of the market reports that are now being broadcasted, dealing with commodities on which we collect complete reports, are Government reports. However, that does not apply to grain in certain localities, where we do not have a complete grain market reporting service. It does not apply to some other commodities which are reported locally, but in a general way the reports gathered by the Federal Government have shown an increase in favor in the past year on the part of the press associations and commercial organizations.

Mr. ANDERSON. If there are no questions we will take up the next item, enforcement of the United States cotton futures act.

FOR ENFORCEMENT OF THE COTTON FUTURES ACT.

Mr. TENNY. This is an appropriation for the enforcement of a definite law. No increase is asked but there is a slight transfer to the statutory roll, leaving the amount actually the same as the appropriation of this year. The only thing of very great importance in connection with this appropriation is that there is an unusually heavy demand on the department for the preparation and distribution of official cotton standards. For the last year or more we have been developing some new cotton standards on some of the main grades of cotton. Those have been promulgated to be effective in August, 1923, and naturally all the people who are going to use those standards are going to want new sets of standards. We are, therefore, securing a considerable amount of cotton and equipment for the purpose of getting these sets ready to go out.

Simply to show the progress of the work, the boards of examiners at New York and New Orleans have classed 234,148 bales of cotton. During the year requests for reclassifying were filed on 43,384 bales. Of these 43,384 that were reclassified the grade was changed somewhat on 3,724.

We are maintaining the same machinery in the Cotton Belt for arriving at the price of cotton at points of origin and the differences in price of the different grades of cotton as provided for in the law.

Mr. ANDERSON. Are you doing any investigational work under this item?

Mr. TENNY. None.

FOR ENFORCEMENT OF THE GRAIN STANDARDS ACT.

The next item is for the enforcement of the United States grain standards act, and the same appropriation is asked for the coming year that we have for this year. During the present year we have not quite as much money as we had last year, which has necessitated the readjustment of our work somewhat. We have eliminated 4 field offices, having now 34 field officers instead of 38. We are taking care of the work in one of these places, Atlanta, Ga., through the office of Federal grain supervision at Nashville. In the other three cities where offices have been eliminated a Federal employee has been left to supervise the inspection, but without expense to the Government other than his salary.

This is a compulsory piece of legislation and this appropriation is used entirely for the enforcement of the law. The enforcement of the law necessitates two lines of work. First I might say that the inspection work is not done by the Federal Government in this grain standards work.

Mr. ANDERSON. Is that universally true?

Mr. TENNY. Yes. The original inspection work is not done by the Department of Agriculture.

Mr. ANDERSON. Do you have any inspectors who are not licensed by States or boards of trade?

Mr. TENNY. No; we have none. The work we have to do is, first, to supervise the inspectors who are employed by the States and boards of trade. Second, the law provides that if any shipper receiver, or interested party desires to appeal from the grade assigned

by a licensed inspector, he may do so, and we have to provide the machinery for taking samples under those conditions and for making the inspections. The appeals have grown tremendously since the work was started. I would like to have in the record for your information the appeals since 1918, when the work was first undertaken. In that year, which was the first full year, there was 1,458 appeals; in 1919 there were 6,651, an increase of 356 per cent; in 1920 there were 10,960 appeals, or an increase over the first year of 652 per cent; in 1921 the number remained approximately the same, although there was a slight increase to 11,617, or an increase of 697 per cent, over 1918, but in 1922, our last year, due to certain conditions, the appeals increased to 31,689, or an increase of something more than 2,000 per cent over 1918 and an increase of almost 300 per cent over last year.

Mr. ANDERSON. I do not recall the exact method of making these appeals, but are these appeals to the supervisors or are they appeals to the Secretary?

Mr. TENNY. They are appeals to the Secretary of Agriculture through local offices of Federal grain supervision.

Mr. ANDERSON. Do the figures which you have readily obtainable show the number of cases in which the grade was raised and the number of cases in which the grade was lowered?

Mr. TENNY. Yes, sir.

Mr. ANDERSON. I would like to have that information.

Mr. TENNY. Very well, we will furnish it for the record. This increased number of appeals is simply an indication that the party interested desires a Federal certificate.

Of the total number of appeals (62,375) to the Secretary of Agriculture through local Federal grain supervisors for true grade determinations under the United States grain standards act, from July 1, 1917, to June 30, 1922, the licensed inspector's grade was changed in 25,716 cases, or 41.2 per cent of the number filed. Of the number of cases in which the grades were changed, in 5,349 cases, or 20.8 per cent, the licensed inspector's numerical grade was raised; in 8,872 cases, or 34.5 per cent, the licensed inspector's numerical grade was lowered, and in 11,495 cases, or 44.7 per cent, the licensed inspector's numerical grade was not changed, but the "grade designation" was changed because of a difference between the inspector and Federal grain supervisor on factors of grade designation such as class, subclass, color, treated grain, etc. In 36,659 of the appeals, or 58.8 per cent of the number filed, the licensed inspector's grade was found to be correct.

Of the 62,375 appeals filed, 30,012, or 48.1 per cent, were taken from "inbound" inspections, and 32,363, or 51.8 per cent, from "outbound" inspections.

All of this appropriation is used for the enforcement of standards of shelled corn, wheat, and oats; we have other grades that are ready for promulgation but they can not be officially promulgated without the enforcement act forthwith becoming operative, entailing upon us the need of doing the supervisory work and the appeal work, but which we can not do.

Mr. ANDERSON. What are the grains for which you have standards but which have not been promulgated?

Mr. TENNY. Rye, milled rice, grain sorghums, barley, and flax.

Mr. ANDERSON. Are there men qualified to make these inspections in the event they should be promulgated?

Mr. BESLEY. If I understood your question, it was whether the inspectors in the country are ready to take these standards and apply them.

Mr. ANDERSON. Yes.

Mr. BESLEY. Yes, sir; they are, with the exception of milled rice and with an additional reservation on the grain sorghums. In the markets where they handle grain sorghums extensively they are equipped, but in certain other markets they would not be.

Mr. ANDERSON. Do the standards which have not been promulgated require specialized equipment?

Mr. BESLEY. Only to a very minor extent. For example, the sorghums would have to have a special set of sieves of certain sizes, but that is practically the only additional equipment.

Mr. TENNY. We have a number of urgent letters from foreign governments for grades, particularly on rye. I have mislaid those letters, although I have them with me. But one is from the German Government to the embassy here and one from a large importer in France, particularly urging that grades be established on rye, so that the importations can be made on the same basis as these other grains. They claim that the present methods are unsatisfactory and that they are not getting uniform deliveries.

FOR ADMINISTRATION OF UNITED STATES WAREHOUSE ACT.

Mr. ANDERSON. We will next take up the item for the administration of the United States warehouse act.

Mr. YOHE. This estimate, which is for administering the United States warehouse act, carries an increase over last year of \$16,400. We shall quite likely use this additional money to place an additional man in our Raleigh office, from which office we cover Virginia and the Carolinas; one additional warehouse inspector to work from the Atlanta office, which serves Georgia, Florida, Alabama, Mississippi, and Tennessee; and an additional inspector in the grain territory extending from the Mississippi to the Rocky Mountains. Then it is contemplated to open an office at Memphis, which will mean placing one additional inspector and taking from the office or inspection force of the Dallas and Atlanta offices certain men and adding them to the Memphis force. It also provides for adding four clerks, two of whom will quite likely come to the Washington office, due to the increased amount of work, which I will show you before I finish; and one to the Denver office, which is to be opened. We now have a man working from that city but have not established any office headquarters. One clerk will be needed in the Memphis office, which will be opened probably after the 1st of July.

It is hardly necessary for me to tell this committee what the purpose is of the warehouse act. It was passed six years ago. Primarily its purpose, in a word, is to aid in orderly marketing and in producing or bringing forth an instrument which can be used for credit purposes when the products are in storage. My understanding of the history of this act is that in the first few years after its passage this committee, and Congress in general, was quite discouraged with what was being done under it; discouraged with respect to the manner in which the farmers themselves, who were supposed to be using it and for whom it was passed primarily, were availing themselves of it, and discouraged also with respect to the manner in which the warehousemen were responding to it.

To develop a credit instrument properly and make it of the greatest use—and in this instance it happens to be the warehouse receipt—it

is necessary to have at least three different parties interested to no small degree. First of all is the producer, who uses the warehouse; second is the warehouseman, and third the banker, the man who will use the credit instrument and make loans thereon.

Naturally it takes some time to get these three different elements interested to such an extent that they will readily respond and avail themselves of the act. However, we believe we have reached the place now where this committee must feel impressed with the fact that the educational work is a thing of the past and where demands are being made almost faster than they can be answered. A few figures in connection with this development will reinforce the point. Up to April 1, 1920, which was almost four years after the passage of the act, we had but 23 cotton warehouses licensed, with a capacity to accommodate 40,050 sales, and 5 grain warehouses, with a capacity to accommodate 136,000 bushels of grain. We had no tobacco and no wool warehouses licensed. One year thereafter we had 238 cotton warehouses, with a capacity to accommodate 429,975 bales; 56 grain warehouses, with a capacity to accommodate 2,108,400 bushels, and 5 wool warehouses, with a capacity to accommodate approximately 24,375,000 pounds of wool.

Up to the 1st of May of this year the figures showed 268 cotton warehouses, with a capacity to accommodate 1,209,695 bales; 263 grain warehouses, with a capacity to accommodate approximately 14,500,000 bushels of grain; 18 wool warehouses, with a capacity to accommodate 27,500,000 pounds of wool, and for the first time we had licensed tobacco warehouses—14—with a capacity to accommodate about 68,000,000 pounds of tobacco. Those figures are as of May 1, 1922. I have taken occasion to bring them practically to date—November 20—so that the committee might see that progress is still being made. We have now 400 cotton warehouses, with a capacity to accommodate 2,000,000 bales of cotton; 218 grain warehouses, with a capacity to accommodate 14,000,000 bushels of grain; 23 wool warehouses, with a capacity to accommodate 25,000,000 pounds of wool; and 52 tobacco warehouses, with a capacity to accommodate 225,000,000 pounds of tobacco.

TERMINAL WAREHOUSES.

Mr. ANDERSON. Have any of the warehouses which have been previously licensed withdrawn from the system?

Mr. YOHE. Oh, yes; there are cases of withdrawing, suspending, canceling, and permitting the licenses to expire. A license is only issued for a period of one year. It may interest you to know just why warehousemen permit their licenses to expire or why they are suspended. Conditions change from year to year with respect to the advantages to be gained in storing or not storing products; also the development of the cotton cooperative movement and other cooperative movements has some effect upon it. You will notice from the figures which I gave you that we have about 2,500,000 pounds less of licensed capacity for wool than we had on May 1. That is due to the fact that one of our licensed warehousemen, who was operating five large wool warehouses in Chicago last year, found that this year, with the increased price of wool, that the farmers were selling their wool quite freely as it was clipped and there was no occasion to store,

and as these warehouses which he had licensed were in leased buildings he decided he could not afford to take the risk of a loss this year, so he did not renew his licenses when they expired; in fact, he asked that some be canceled. The same thing is true of grain. In grain we had one case where a warehouseman had 68 licenses last year and this year, due to cooperative movements in that particular section and the movement of grain for export, he did not renew his licenses on more than about 34. His warehouses were in leased buildings and he could not afford to take the risk of a loss.

Mr. ANDERSON. Are these terminal warehouses as a rule?

Mr. YOHE. No; they are practically all at country points. We have not gone into terminal territory as yet. We have one rather large warehouse, which is terminal in nature, at Davenport and another at Fort Worth, with a capacity to accommodate about 1,000,000 bushels. We have one at Mansfield, Ohio, and we have now pending an application from the Mill and Elevator Association of North Dakota for the licensing of the warehouse at Grand Forks, which has a capacity of about 2,000,000 bushels. If we once begin to get applications from these terminal warehouses, it is going to make very heavy inroads into our appropriations, because it will practically mean that we will have to station one man continuously at such terminal warehouses.

I do not know whether the committee would care to see how the work is going with respect to the large warehouses, but your inquiry with respect to terminal warehouses prompts me to place in the record some figures with respect to how the large cotton warehousemen are availing themselves of the act. As you probably recall, in the first few years most of the cotton warehouses were owned by small operators, but now we have a great many ranging from 4,000 bales' capacity up to 165,000 bales. I shall be very glad to give the clerk the figures to place in the record.

(The figures referred to follow:)

Number and capacity of warehouses.

| Number of
warehouses
May 1,
1922. | Number of
warehouses
Nov. 20,
1922. | Capacity
in bales. | Number of
warehouses
May 1,
1922. | Number of
warehouses
Nov. 20,
1922. | Capacity
in bales. |
|--|--|-----------------------|--|--|-----------------------|
| ----- | 10 | 4,000 | 1 | 2 | 18,000 |
| 14 | 21 | 5,000 | 1 | 1 | 18,500 |
| 7 | 8 | 6,000 | 1 | 1 | 19,000 |
| 3 | 6 | 7,000 | 2 | 4 | 20,000 |
| 1 | 2 | 7,500 | 2 | 2 | 22,000 |
| 3 | 5 | 8,000 | 2 | 1 | 25,000 |
| 1 | 1 | 9,000 | ----- | 3 | 26,000 |
| 11 | 17 | 10,000 | ----- | 1 | 29,000 |
| 1 | ----- | 10,500 | 4 | 3 | 30,000 |
| 1 | ----- | 11,000 | ----- | 1 | 35,000 |
| 1 | 1 | 11,500 | 1 | 1 | 40,000 |
| 1 | 2 | 12,000 | 1 | 1 | 52,000 |
| ----- | 2 | 13,000 | ----- | 1 | 54,000 |
| 4 | 6 | 14,000 | 1 | 1 | 75,000 |
| 5 | 9 | 15,000 | ----- | 1 | 165,000 |
| 1 | ----- | 16,000 | ----- | ----- | ----- |

ACTIVITIES OF COOPERATIVE ASSOCIATIONS.

Mr. YOHE. I might state that the tremendous increase in this work in the last two years, and particularly in the past year, is due, in a measure, to the influence of these cooperative associations. Take

the Long Staple Cotton Association, at Greenwood, Miss. It adopted as its policy, before the organization was practically completed, that all of its cotton should be stored in federally licensed warehouses, and to show how rigidly it has adhered to its policy, it has refused to place any cotton with any warehousemen unless they become licensed. One warehouseman held out, and after there had been something between 500 and 1,000 bales of cotton placed with him, on the assumption that he would become licensed, he still refused, and the president of the association sent a raft down the river, or some kind of a flatboat, and put 500 bales of cotton on the boat; he put a sign on it reading, "Going to a federalized warehouse," and shipped it up the river. The result was the warehouseman wired to be licensed as soon as we possibly could make arrangements. That association has absolutely, during this year and last year, put all of its cotton in licensed warehouses. The same thing is true of the North Carolina Cotton Growers Association, and the Arkansas Cotton Growers Association, and practically every one of the associations are in some measure using licensed warehouses, although some of them have not adopted the licensed warehouse as their exclusive policy.

WAR FINANCE CORPORATION LOANS.

The work of the War Finance Corporation in this connection has undoubtedly been expedited considerably as far as making loans to these cotton associations have been concerned. This year the War Finance Corporation has had applications for loans from practically every one of the cotton growers' associations. The North Carolina Cotton Growers' Association has applied for \$10,000,000; the South Carolina Cotton Growers' Association has applied for \$10,000,000; the Georgia Cotton Association has applied for \$5,000,000; the Alabama Farm Bureau Cotton Association has applied for \$3,000,000; the Staple Cotton Cooperative Association has applied for \$7,000,000; the Arkansas Cotton Growers' Association has applied for \$7,500,000; the Arkansas Farmers Union Cotton Association has applied for \$1,000,000; the Texas Farm Bureau Association has applied for \$9,000,000; the Oklahoma Cotton Association has applied for \$6,000,000; and the Arizona Cotton Association has applied for \$1,200,000. In each one of these applications, and as a part of the agreement with the War Finance Corporation, the stipulation was made that as collateral for loans the War Finance Corporation would accept, without further question, Federal warehouse receipts, but that if receipts issued by any warehousemen who were not operating under the Federal act were presented as collateral the War Finance Corporation would reserve the right to inspect and pass upon the receipts issued by such warehousemen. In other words, it placed the Federal warehouse receipts at once on the basis of being an acceptable piece of paper to the War Finance Corporation without any further consideration.

Mr. ANDERSON. If I remember correctly, all commodities that are placed in Federal warehouses have to be inspected and classed before they go in?

Mr. YOHE. The law originally provided that the grade should be stated on every receipt. Then a year afterwards, I think, it was amended to read that the grade should be stated on every receipt

issued for nonfungible products unless the depositor requested otherwise, leaving it optional with the depositor as to whether the grade and class should be stated. In that connection it is interesting to note that the depositor is fast getting to the place where he is having his grade placed on the receipt, but it should be pointed out that the option is only with the depositor and not with the warehousemen; in other words, if a depositor says nothing with respect to grade, it must be noted on the receipt.

Mr. ANDERSON. Do these warehousemen maintain inspectors for determining the specific grades or do they have Federal inspectors?

Mr. YOHE. No; they have their own graders and inspectors; in fact, we will not license a warehouseman until he has satisfied us that he has someone who is capable of grading under the law, and provision is made for licensing inspectors. The same is true with respect to graders.

In administering this act and in our relation with the War Finance Corporation we have recognized that, of course, the War Finance Corporation could not very well say it would not accept as collateral any form of warehouse receipt unless it was issued by a federalized warehouse, and to meet the War Finance Corporation in that respect we have assisted in a great many instances by giving information with respect to the warehouses which might be used but which were not licensed, as well as information as to the management and financial responsibility of the warehouses, and in a great many instances we have undertaken to supervise and inspect nonlicensed warehouses which might be used by different associations.

APPLICATIONS FOR LICENSES PENDING.

Mr. ANDERSON. How many applications for license have you pending now not acted upon?

Mr. YOHE. I should imagine not more than 15 or 20 that have not been acted on as far as we can act. By that I mean to say that a considerable number of other papers must be filed besides applications. These are cases where the application had been filed, and we have not had an opportunity yet to make inspections of the plants, or where the warehouseman has not been able to file a bond, or because there is some other difficulty in the way.

WAREHOUSE RECEIPTS.

It has occurred to me that, perhaps, I can best show the growth of the work and the result of the work of the department with the bankers, in getting them interested in these federalized warehouse receipts, and getting them to the place where they fully appreciate what the receipts mean, by reading to the committee a few extracts from the minutes of the American Bankers' Association, which was in session the other week at New York. This part of the minutes is a part of some resolutions prepared by a subcommittee of the committee of commerce and marine of the association. It reads in part as follows:

Realizing the great importance of enabling the farmers to market their crops more orderly and in closer relation to the consuming needs of the country, your commission has deemed it appropriate to consider and comment briefly upon the United States warehouse act passed by Congress in 1916.

At this point the committee included some figures showing the progress that had been made, and it goes on to say:

These warehouses for the most part are located directly in the producing areas and therefore directly serving the farmer and giving the receipts local value as well as making it more desirable collateral in the money centers and providing a wider field for its usefulness.

The rapidity with which the cooperative marketing associations are being organized throughout the country and the variety of products which are now being brought into this new selling plan is making it necessary to give the warehouse receipt more careful consideration by both banker and farmer.

The United States warehouse act is just now coming into its own, and the producer, the banker, and the public generally will be materially benefited by this piece of legislation. Certainly it has opened a great field of credit to the producer, which he would not otherwise have had and it also guards the interests of those who make loans with warehouse receipts covering agricultural products as collateral.

Your committee wishes to commend the act to your consideration and believes its many advantages will be of growing benefit to the country.

In this connection, to show the committee how closely we have worked with the War Finance Corporation, I would like to include in the record a letter signed by the managing director of the War Finance Corporation, reading as follows:

I wish to take this opportunity to thank you for the valuable services which your bureau has rendered to the War Finance Corporation in connection with loans made by the War Finance Corporation to cooperative marketing associations throughout the United States.

These loans have been made as you know on the security of warehouse receipts representing the commodities to be marketed, and it has been of prime importance that such commodities be properly warehoused. In a large majority of cases cooperative associations obtaining advances from us have given as security receipts issued by federally licensed warehouses, licensed and supervised by your bureau. The fact that a warehouse is so licensed and supervised has given us added feeling of security and an assurance that our interest in the security was being properly cared for, and the integrity of the warehouse receipt respected.

From my experience in the work of the War Finance Corporation, I believe that the safeguards imposed under the licensing system of your bureau adds greatly to the value of a warehouse receipt as security and works to the advantage of the persons or institutions which lend money on warehouse receipt security, of the owner of the commodities, and of the warehouse which assumes responsibility for the receipts.

We have found the form of warehouse receipt required by your bureau especially valuable in connection with our loans. In connection with our cotton loans, for instance, the warehouse receipt issued by federally licensed warehouses certifies on its face not only the number of bales, but the weight, grade, and staple of the cotton. Such certification adds greatly to the value of the receipt as collateral.

Mr. Chairman, it is not necessary, or I do not believe it is necessary, to burden the record to show the progress we have been making under this piece of legislation, but as you can easily appreciate the usefulness of it will depend in large measure upon the attitude which the bankers may take toward the federalized warehouse receipt. Therefore, I would like to put into the record part of a letter from the recent governor of the Federal Reserve Board, reading as follows:

I think it is recognized by banks and other financial institutions that warehouse receipts representing readily marketable nonperishable agricultural commodities properly warehoused are a desirable kind of security for bank loans. It is apparent, of course, that some warehouse receipts are more desirable than others, and that the degree of desirability is dependent upon a number of factors, included among which are the form and legal effect of the receipt, the question of whether or not the issuing warehouseman is licensed, bonded, and operated under Federal law or a State law furnishing proper safeguards, and is supervised and examined by competent officials with a view to the protection of the public, the reputation and financial responsibility of the warehousemen, the physical conditions affecting the warehouse, the question of insurance, etc.

Generally speaking, there can be no doubt, I think, that warehouse receipts issued by warehousemen licensed and bonded under the United States warehouse act will be considered by bankers as more desirable collateral security than those issued by warehousemen who are not licensed or bonded under any State or Federal law.

There are a great many other statements which I might place in the record, but I think these will suffice to show that the Federal reserve banks, the War Finance Corporation, and all those who have to do closely and intimately with the granting of credit to farmers based upon products when they are in storage are fast reaching the point where they respect more highly the Federal warehouse receipts than almost any kind of receipt issued by warehousemen.

INCREASE IN WORK.

Mr. ANDERSON. You appear to be anticipating some increase in this business. What is the basis upon which you anticipate an increase?

Mr. YOHE. The basis of our anticipation is the realization of the past two years, and the further fact that we know that there are a good many warehousemen not now in the system who expect to come in next year. I am quite confident that we shall see just as much of an increase in the licensing of cotton warehouses, or in the demand to be licensed, next year as we have had in the last two years. We have been told that the Tobacco Growers' Cooperative Association of the Connecticut Valley intended to use licensed warehouses exclusively this next year. We are quite confident that there will be a big increase in the licensing of grain warehouses between the Mississippi River and the Rocky Mountains, as well as in the Northwest. In fact, the estimate which is before the committee is not in line with our anticipation of what the needs will be. Our anticipation is based entirely upon what has taken place in the last two years, and upon what we have pretty concrete evidence now in definite expressions of intention on the part of those who have warehouses.

Mr. TENNY. The committee should realize that this work involves the making of reinspections, and the more warehouses that are licensed, the more reinspection work has to be carried on.

FOR ENFORCEMENT OF THE STANDARD CONTAINER ACT.

Mr. ANDERSON. The next item is for the enforcement of the standard container act. The current appropriation for this purpose is \$3,800, and the estimate for 1924 is \$5,000.

Mr. SHERMAN. The estimate for the enforcement of the standard container act is \$5,000; \$1,200 of the amount previously appropriated or allotted from the original appropriation of \$5,000 was set aside for one statutory place, and the lump fund was reduced to \$3,800. That has been the amount of the lump fund, I believe, for the last two seasons, perhaps. That is no longer sufficient to carry the salary of one technical man in charge and his necessary travel, if he is to do the work that he should do under this appropriation. As a matter of fact, another man from the grades and standard work has been obliged to give a part of his time to this work.

Mr. ANDERSON. You have only one on this job?

Mr. SHERMAN. Only one man is giving his whole time to this job. There are hundreds of manufacturers making these containers, all of

whom are under the provisions of the act, and the act, of course, in order to be effective, must be enforced at the factory. Now, the factories are not making us any trouble, because the factories that are making these packages that are used in interstate commerce want to comply with the law. It is entirely a matter of testing the new forms that they put in, or of testing the samples that they send in to us, and in visiting the new men and in visiting the factories at times when they put in new machinery, with which they have trouble, and with which they are not turning out strictly standard containers.

Mr. ANDERSON. What does this container act cover?

Mr. SHERMAN. It covers grape baskets, berry boxes, and tills.

Mr. ANDERSON. That is all?

Mr. SHERMAN. Yes, sir, that is all, but, as a matter of fact, the same manufacturers who are making Climax grape baskets are also manufacturing strawberry and raspberry boxes and tills, and a good many of them are also manufacturing the round stave bushel basket, which is coming into very general use. They send us all those packages in order that they may know whether they are making standard bushel baskets, or not. They do not want to make nonstandard packages, especially those covered by pending legislation.

Mr. ANDERSON. In this work you have to cover containers that really are not covered by law at all?

Mr. SHERMAN. We have to do some work on containers that are not covered by the law itself, and the same man is working on both.

FOR COMPLETION OF WOOL WORK.

Mr. ANDERSON. The next item is on page 294, for the completion of the wool work.

Mr. SHERMAN. Under this item we are asking for \$3,000 less than you gave us last year for this work. The collection and distribution of excess wool profits have reached the point where our speed is dependent entirely upon the speed of the courts. We have distributed practically all of the money which we have collected, that can be distributed, except certain funds that were paid under protest, and which we can not disburse until the courts have decided certain pending cases. We have actually disbursed and sent back to the wool-growers between three and four hundred thousand dollars, and in doing so we have accumulated an undistributable fund in the Treasury, for which no growers can be located, amounting to over \$100,000, which amounts to more than all that has been spent in the entire course of the collection and distribution.

Mr. ANDERSON. How much have you in process of liquidation or held up by suits?

Mr. SHERMAN. We have over \$800,000 in sight that has not been collected, but it is not all in suit. That is, in some of those cases we still have assurances that the amounts will be paid whenever the amounts can be arrived at. In some cases there are estates to be settled, and the executors assure us that they will settle with us whenever they get through settling for income taxes, etc.

Mr. ANDERSON. Suppose you give us the exact status of the matter, or furnish a statement showing how much money has been collected, what amount has been disbursed, etc.

Mr. SHERMAN. I will do that. We have that statement every week, and I can give it to within seven days of this time.

PRESENT STATUS OF THE COLLECTION AND DISTRIBUTION OF EXCESS WOOL PROFITS
TO NOVEMBER 25, 1922.

| | |
|--|----------------|
| Net excess profits collected..... | \$650, 682. 15 |
| Amounts mailed to growers..... | \$360, 066. 41 |
| Undistributable (growers unknown)..... | \$106, 798. 37 |
| Total number of checks mailed..... | 105, 576 |

Balance in hand is held under protest or is composed of partial payments on pending cases or sums in process of distribution.

| | |
|--|----------------|
| Total excess profits ascertained and uncollected..... | \$816, 056. 07 |
| Total excess in hands of solicitor or Department of Justice..... | 615, 198. 87 |
| Excess pending uncollected in our hands..... | 200, 857. 20 |

This sum is covered by excess profits due from estates which are in course of settlement, the executors of which have promised settlement without suit; cases in which partial payments have been made and notes given for balances due; and a few in which attorneys for the dealers have assured us that settlement will be made without suit whenever the exact amounts due under the regulations have been agreed upon. A few of these cases are still open because of unusual conditions surrounding the dealers' business which caused him to deviate from regulations in handling the 1918 clip, resulting in erroneous audits of the reports originally submitted. There are in all only 21 pending cases, which have not been passed to the solicitor for legal action and their number is decreasing almost monthly.

More than 5,000 dealers participated in the handling of the 1918 wool clip. Final settlement has been made with all but 78 of these firms. Among these 78, however, are several firms whose excess profits were large. From one of these firms we are demanding over \$295,000. Their attorneys have stated that they will appeal this case to the United States Supreme Court before they will make payment.

Three United States district judges have overruled demurrers entered by defendant wool dealers claiming that the regulations were invalid and that the Government was without right to bring suit for the recovery of these so-called excess profits. Three other United States district judges have heard arguments on similar demurrers. One has rendered no decision, another has expressed the opinion that the Government has a legal and binding contract with the dealers but that it is misappropriating the moneys received or is recovering them for an illegal purpose. He has withheld decision as to whether this fact established a condition which is open to demurrer. The third judge expressed the verbal opinion that the contract, evidenced by the acceptance of a permit, was binding, promised to render his judgment on a stipulation of facts submitted by the Government and defendant and, at the request of the Government, to put his opinion in writing, which thus far has not been received.

Mr. ANDERSON. Have any of the lawsuits been tried?

Mr. SHERMAN. In several cases argument has been heard on demurrers. In nearly every case the defendant has demurred to our complaint, and has alleged that the Government had no right to maintain a suit. There have been three decisions by United States district judges, the decision in each case upholding the Government's right to sue. Argument on similar demurrers has been made before three other judges, who still have the matter under consideration and have not handed down decisions.

Mr. ANDERSON. You have had no adverse decisions?

Mr. SHERMAN. No, sir. We have, however, an expression of opinion by Judge Martin, of Boston, that in his mind there is no doubt that the Government has a legal and binding contract with the dealers, but that there is no doubt in his mind that the purpose to which the money is being devoted is wholly illegal. So he allowed the question to be reargued as to whether the illegal purpose for which the money was being collected and expended was a matter open to demurrer. On that point he has not rendered a decision.

Mr. ANDERSON. What is the basis of this reduction?

Mr. SHERMAN. The basis of this reduction is the release of auditors from the work.

FOR OPERATION AND MANAGEMENT OF CENTER MARKET.

Mr. ANDERSON. We will take up the Center Market item on page 345.

Mr. KITCHEN. The appropriation for the Center Market, Mr. Chairman, covers an estimate for the first time that the Government has ever actually operated the place. The law transferring the property to the Government was passed on March 4, 1921. That act provided that a commission should be appointed by the President to make a valuation of the physical improvements on the land, and the commission was appointed on the 4th of October, 1921. The commission completed its work within six months, as required by law, and filed its award on the 31st of March, 1922. The award amounted to \$960,250. On the 1st day of April of this year, the Department of Agriculture assumed control of the property and took over the management of it. We are operating a large business institution. Before taking it over, we had to draw rules and regulations, which we have done, and we had to change the accounting system so as to conform to the fiscal requirements of the Treasury. We put all of the tenants under lease, and other contracts were made. One of the difficult things that we had to handle was that at the time we took over the property the cold-storage warehouse was practically filled with perishable commodities. All of those accounts had to be liquidated, and the storage due the market company had to be paid to the market company, and that due the Government had to be collected as it became due.

SANITARY CONDITIONS IMPROVED.

We started out in the operation of the market itself, first, to improve the sanitary conditions, and we have had a general clean-up. We have painted the ceiling in the interior court of the B Street wing, and we have painted the interior of the bowling alley completely and the side walls of the auditorium. We have also remodeled the public toilet facilities at considerable expense. In connection with the sanitation work, we have issued regulations covering the handling of meats, and have employed a meat inspector by transfer from the Bureau of Animal Industry to protect the public against the sale of impure or unwholesome meats. The duties of that inspector are also to make sure that the utensils and equipment used in handling meats are kept in a thoroughly clean and sanitary condition. The cold-storage warehouse is operated on as nearly a commercial basis as is practicable under Government control. We receive commodities for storage from tenants and from outsiders, and the storage is paid on the basis of the established rates.

OPERATION OF BUSINESS SELF-SUPPORTING.

I am glad to inform the committee that the operation of this business by the Government is entirely self-supporting. I have a statement here covering seven months, or from the time we took the property over, showing our receipts amount to \$139,219.23, against an expenditure of \$109,087.56. The expenses show a balance in the Treasury of about \$30,000. At the present rate of expense and income we will take in about \$240,000 this year. Our appropriation

is \$165,000, and barring unforeseen accidents, we probably will not expend over \$155,000 for the reason that we have been asked to set aside about \$8,000 as a reserve. Of course, that may be spent in case we have serious accidents.

Mr. ANDERSON. How does that \$240,000 receipts compare with the receipts of the market under private management?

Mr. KITCHEN. As nearly as I can find out, it compares almost exactly. You may remember that when I made a statement before the committee before, we estimated that the receipts would amount to \$258,000, but I am not now prepared to say that that was correct. The Market Co. operated the Center Market and the Washington Terminal Storage Co. as one corporation, and in the appraisal hearings, considerable difficulty was encountered in separating the activities for the two plants.

We have issued our leases for the same rates. Our storage rates in some instances have had to be lowered, because they have lower rates, and we have had to meet their competition.

So I make a conservative statement that our income probably would not be more than \$5,000 less than theirs, and a margin of that kind could be accounted for by natural changes in business conditions.

The handling of the auditorium under our management is more productive than it was under theirs.

Mr. ANDERSON. You are still maintaining the auditorium?

Mr. KITCHEN. Yes.

Mr. ANDERSON. Is there any change in that situation?

Mr. KITCHEN. We have kept the auditorium and rent it for special occasions, so that it can be available for use by the department for any purpose desired.

AUTHORITY NEEDED TO PAY CLAIMS.

We have run into some difficulty in operating a business concern, due to the regulations of the Government, and we will have to ask for a little additional authority to carry us through.

Since the estimates were made we have presented to the comptroller two small claims for damage to goods in cold storage. One is for \$12 and one is for \$17. And when we drew this law in the first place we inserted the word "claims," but the comptroller feels that payment of these claims is unauthorized, so I have some language here which I will present for your consideration.

Mr. ANDERSON. Well, this committee, of course, has no legislative jurisdiction. There is no objection to it being submitted, but I do not think that we can do anything with it.

Mr. KITCHEN. Well, how are we going to pay the claims?

Mr. ANDERSON. You will have to ask the authority of Mr. Haugen's committee, the Committee on Agriculture, I guess. Well, go ahead and present the proposition anyway, and we will deal with that later on.

Mr. KITCHEN. Well, the proposition is this, that we would like to have made a part of the appropriation authority the following language. After the word "made" insert the following:

and to pay in accordance with regulations of the Secretary of Agriculture any claims for damage to goods while in storage in Center Market that have accrued or may accrue at any time during the operation thereof by the Secretary of Agriculture.

It is almost a physical impossibility, Mr. Chairman, to operate a business of that kind without some provision to meet these small damage claims. It is customary in the operation of commercial storage houses that if any goods are damaged by the negligence of the company that the company will make good, and I feel that having handled several hundred thousand dollars worth of goods in and out of storage, during the last seven months, and having presented claims amounting to only \$29 that we are doing very well. And if we are not given authority to pay these little claims these fellows will say that the Government is not responsible and they will take their business somewhere else, and we will lose money. That is the argument for paying the claims, and if this is not the proper committee to present it to, we would be glad to have it go before the proper committee.

Mr. ANDERSON. Well, as I say, we theoretically and practically do not have any legislative jurisdiction. If that language can be supported by the language of the act itself, I suppose we can appropriate for it. The real question from our point of view is whether the language of the acts authorizing the operation of the market by the Secretary of Agriculture furnishes sufficient basis for appropriations to pay claims of this character. I would imagine that it did.

Mr. MAGEE. Are you given power to take goods in storage?

Mr. ANDERSON. Yes.

Mr. MAGEE. I should think that there would be the implied power to pay for any damages.

Mr. ANDERSON. Let me ask this question: Is the comptroller's decision based upon the language of the appropriation, that it does not give authority?

Mr. KITCHEN. No; the principal argument is this:

The general policy of the laws of the United States is against assumption of liability for damages indefinite as to amount. If damage claims growing out of willful acts or negligence of employees operating this cold-storage plant are to be recognized and paid, there should be specific authority of law for such payment, with such restrictions and limitations as Congress may see fit to impose. As the law now stands payment of the claims is unauthorized.

I just got this on November 23. It has been pending for some time.

Mr. JUMP. Mr. Chairman, could not this language go in in the form of a limitation as to the amount of claims which the Secretary could pay?

Mr. ANDERSON. I should think so.

Mr. JUMP. It could specifically provide that the amount "shall not exceed" so much.

Mr. ANDERSON. I judge from what has been read that the comptroller's objection is that the language of the appropriation does not authorize the payment of the claims.

Mr. KITCHEN. The basic law, however, gives the Secretary of Agriculture the following authority:

The Secretary of Agriculture is hereby authorized, out of appropriations made by Congress from time to time for that purpose, to employ such persons and purchase such materials as may be essential to the operation or maintenance of said property and for the proper management and control thereof. (41 Stat. 1441, sec. 2.)

It seems to me that the payment of these claims would be a proper authorization by the comptroller.

Mr. MAGEE. What is the specific amount of the claims?

Mr. KITCHEN. We have only had two claims, and they amount to \$29.

Mr. MAGEE. You recognize that amount as just?

Mr. KITCHEN. Yes. We secured all of the necessary supporting statements before they were sent to the comptroller.

Mr. ANDERSON. The whole question is on the legal aspect, as to whether you have authority to pay them, rather than upon the validity of the claims?

Mr. KITCHEN. They are absolutely good claims and I recommended that they be paid; but these being the first ones, naturally we made a test case of them, and put the proposition up to the comptroller. We can not afford not to pay these claims.

Mr. BUCHANAN. Have you any records upon which you could base an estimate of the total amount of claims that might be allowed during a fiscal year, or what they would amount to?

Mr. KITCHEN. Well, these two claims occurred in May, I believe, and we have not had any since. Now, if everything goes well, we might go through a year and not have a claim. On the other hand, some experienced man might quit and we might get more claims in a month than we had had for two years.

Mr. JUMP. Something might happen overnight, and we would have more claims the next morning than we might have in two years with good luck.

Mr. KITCHEN. Yes. A serious mechanical accident might produce large claims.

I believe there was some other language, also.

Mr. ANDERSON. There is some new language proposed in the estimates.

PURCHASE OF NECESSARY SUPPLIES AND EQUIPMENT.

Mr. KITCHEN. Yes. The other change that we would like to have is after what I have just suggested. We would like to have the words—

Provided, That the Secretary of Agriculture may purchase necessary supplies and equipment for use at Center Market without regard to awards made by General Supply Committee.

We have felt justified for asking for that for this reason, that we are operating a business institution and competing with other business institutions, and in buying supplies and materials we frequently find that we can buy cheaper in the open market than we can through the General Supply Committee contracts, and for that reason we would like to have authority to buy either through the General Supply Committee or in the open market, whichever we believe to be most advantageous to the Government; but in doing that we would not be released from any of the laws or regulations of the department requiring competitive bids. Any purchase under the Department of Agriculture amounting to more than \$50 has to be purchased by open bids.

Mr. MAGEE. Open bids?

Mr. KITCHEN. Yes. This language is merely to place the Government on an equal footing with private industry in the operation of this plant.

Mr. MAGEE. Where you purchase supplies you get them all through the General Supply Committee?

Mr. KITCHEN. Yes, sir; unless they can not furnish them.

Mr. MAGEE. Then, how do you get your supplies, through competitive bidding?

Mr. KITCHEN. If there is more than \$50 involved in the purchases.

Mr. MAGEE. Does the law provide that?

Mr. KITCHEN. Yes.

Mr. MAGEE. This would be in direct conflict with the law as it now stands if you wanted to purchase anything in excess of \$50?

Mr. KITCHEN. No; this does not say that. This merely gives us authority to purchase either through the General Supply Committee—

Mr. MAGEE (interposing). Well, what I am talking about is that if you did not wish to purchase through the General Supply Committee, you could go into the open market and make your purchases in excess of \$50, without competitive bids?

Mr. KITCHEN. Well, we could not unless—

Mr. MAGEE (interposing). Well, if Congress should adopt this language, you could.

Mr. KITCHEN. It is my understanding that the basic law of the Agricultural Department—

Mr. JUMP (interposing). Both the law and the regulations of the department require that we obtain competitive bids for any purchases in excess of \$50 in the Department of Agriculture in Washington, except in cases of emergency or cases where competition can not be obtained.

Mr. MAGEE. And if Congress should adopt this language, you would not have to do that?

Mr. JUMP. The language proposed would not affect that at all, because the regulations promulgated by the Secretary of Agriculture and which are in the hands of every purchasing officer provide that any purchase in excess of \$50 must be by competitive bidding, except as I stated a moment ago. The only thing that this language does is to avoid the necessity of purchasing under the General Supply Committee contracts so far as Center Market is concerned.

Mr. MAGEE. I do not see where this has anything to do with the regulations of the Secretary. It says:

Provided, That the Secretary of Agriculture may purchase necessary supplies and equipment for use at Center Market, without regard to awards made by General Supply Committee.

Mr. JUMP. They would not be relieved by this language from the restrictions imposed by the Secretary, because they would continue to be enforced and are not affected by the proposed change.

Mr. MAGEE. You do not think that the regulations of the Secretary of Agriculture affect the law as enacted by Congress?

Mr. JUMP. Not if the two are related, but in this instance you do not have that. This merely relieves the Center Market from the obligation it now has to purchasing all of its supplies possible through the General Supply Committee's contracts.

Mr. MAGEE. Are you a lawyer?

Mr. JUMP. No, sir.

Mr. MAGEE. Well, I am, and I think that I can tell what the English language means when it is clear. This language reads:

Provided, That the Secretary of Agriculture may purchase necessary supplies and equipment for use at Center Market without regard to awards made by the General Supply Committee.

My legal judgment is that if Congress enacted this language, that you could make all of your purchases without regard to the terms laid down either by the General Supply Committee or anybody else.

Mr. ANDERSON. As I understand, the regulations of the department require competitive bids for all purchases in excess of \$50, under departmental regulations, and that those regulations are based on the statute. Is that correct?

Mr. JUMP. They are based on the statute; that is correct.

Mr. KITCHIN. When we talked this over with the solicitor, when this appropriation was being considered there, he stated that if this were approved by Congress that we would be bound by the \$50 limit and we would have to secure competitive bids for any purchases over that amount.

Mr. BUCHANAN. But the position taken by my colleague is that this is legislation in this bill and that it modifies the statutory law and should come through the proper legislative committee.

Mr. MAGEE. Yes.

Mr. BUCHANAN. New legislation.

Mr. MAGEE. New language.

Mr. ANDERSON. There is no question about that.

Mr. MAGEE. If this is put in, then the amounts in excess of \$50 would not come under existing statutes.

Mr. BUCHANAN. That is the regulation.

Mr. MAGEE. I understood him to say that it was a statute, that there was a statute requiring them to secure competitive bids where purchases exceeded \$50 in amount.

Mr. ANDERSON. That, of course, is where the purchases are not made through the General Supply Committee.

Mr. MAGEE. Whether it is a regulation or a statute, I do not know.

Mr. KITCHIN. I do not know whether it is a regulation or a statute; but I know that we have to do it before we can get purchases approved.

Mr. JUMP. The law, the regulations, and the policy of the Department of Agriculture are not to permit any purchases in excess of \$50, without competitive bids, unless there is an emergency or some other extenuating circumstance, which makes it necessary to purchase a certain item. I will have the law covering the matter looked up and a statement inserted in the record.

The law (Rev. Stats., sec. 3709, p. 733) reads as follows: "All purchases and contracts for supplies or services, in any of the departments of the Government, except for personal services, shall be made by advertising a sufficient time previously for proposals respecting the same, when the public exigencies do not require the immediate delivery of the articles, or performance of the services."

This provision of the law was amended on March 1, 1899 (30 Stat. L. 957) by providing "That hereafter section 3709 of the Revised Statutes of the United States shall not be construed to apply to any purchase or service rendered in the Department of Agriculture when the aggregate amount involved does not exceed the sum of \$50."

Mr. MAGEE. The point that I am making is that Congress enacts any legislation which is in conflict with the existing legislation, and it is necessary to construe the language of the act, the last enacted language would rescind the prior enactment. Now, if we are going to adopt this law here providing authority for you to purchase in this manner, you might still purchase through the General Supply Committee, if you did not have authority to make these purchases in excess of \$50 without competitive bidding.

Mr. ANDERSON. Well, is there anything further on this language?

Mr. KITCHEN. We have suggested one more minor change in connection with this: After the words "6 per centum per annum," we would like to insert the words "under such rules as the Secretary of Agriculture may prescribe." That is merely to clarify that.

Mr. ANDERSON. You propose an increase under this appropriation of about \$11,000. What is that for?

INCREASE IN APPROPRIATION.

Mr. KITCHEN. The principal purpose for which that will be used will be to remodel, modernize, and improve stands in the market and to purchase some small items of equipment. Those stands in the market, some of them, were built when the market was constructed in 1872, and about half of them have been remodeled and brought up to date, but none of them are as modern as you will find in the best equipped markets in the country. We have constructed three since we have been there, and I think all of that increase of \$11,000 would be used primarily for that purpose.

Mr. ANDERSON. Under new equipment?

Mr. KITCHEN. Wherever we improve the stands and improve the equipment, we increase the rent 20 per cent.

Mr. MAGEE. And you say that you are taking in \$240,000 and your expenses amount to about \$160,000?

Mr. KITCHEN. Approximately \$160,000.

Mr. MAGEE. And the Government owns the property?

Mr. KITCHEN. I would like to add to that statement that——

Mr. MAGEE (interposing). Does the Government own the property?

Mr. KITCHEN. Yes.

Mr. MAGEE. Buildings and all?

Mr. KITCHEN. Yes.

Mr. MAGEE. Have you made any allowances for depreciation or anything of that sort?

Mr. KITCHEN. If we take in \$240,000 and spend \$155,000 for operating expenses, alterations, improvements, we would have left \$85,000. The taxes on the land and the building and the water rents formerly paid by the private corporation amounted to \$25,000, and adding that to our operating expenses would bring them up to \$180,000, leaving \$60,000. And then I figure on the amount of the award, which was \$960,000, interest at the rate of 5 per cent, which would amount to \$48,000, and still leave us a surplus of \$12,000. I figure that the improvements that we have made to the building will offset the depreciation.

Mr. MAGEE. What about repairs as necessary?

Mr. KITCHEN. Well, I say the repairs and improvements which we make would add to the capital account and offset depreciation.

Mr. MAGEE. Do you figure on any insurance, too?

Mr. KITCHEN. We have not figured insurance.

Mr. MAGEE. What would your insurance amount to?

Mr. KITCHEN. I do not know what the insurance would amount to, but the figures certainly do show that we can make a return of between 4 and 5 per cent on the amount expended by the Government, allowing for taxes and all.

Mr. MAGEE. Taxes and water rent would be how much?

Mr. KITCHEN. Twenty-five thousand dollars.

Mr. MAGEE. That would make \$155,000 plus \$25,000.

Mr. KITCHEN. Which would be \$180,000, subtracted from \$240,000 would leave \$60,000.

Mr. MAGEE. The interest is how much?

Mr. KITCHEN. Forty-eight thousand dollars.

Mr. MAGEE. You figure that at 5 per cent?

Mr. KITCHEN. Five per cent on \$960,000 would be \$48,000. Subtracting that from \$60,000, leaves \$12,000.

Mr. MAGEE. Do you know what your insurance would be?

Mr. KITCHEN. No; but it certainly would not be more than that. We will check that item up, though, to make sure.

NOTE.—As nearly as can be ascertained, the amount of the fire insurance premium paid in the past on the Center Market property was approximately \$5,000 per annum.

Mr. TENNY. I want to make one statement about that \$11,000 increase. If we have anything to do with the market we are going to get that baked goods stuff under cover and——

Mr. ANDERSON (interposing). That what?

Mr. TENNY. Baked goods, pies, cakes, that is now handled out in the open market. That has got to go under glass cases, and we are very anxious to have an increase to take care of the amount of improvements necessary.

Mr. ANDERSON. How much would be involved in that?

Mr. TENNY. Mr. Kitchen, can you give an estimate?

Mr. KITCHEN. We have not prepared an estimate on that. Stands already built have cost us about \$1,000 apiece.

Mr. MAGEE. How much?

Mr. KITCHEN. About \$1,000 apiece.

Mr. ANDERSON. You said that you increased the rent 20 per cent when you made improvements. Twenty per cent on what?

Mr. KITCHEN. Over what it is now, to reimburse us for the improvements. I feel that it is only proper if we improve a man's facilities to let him pay a little more. It is only fair if we improve a man's facilities that we should be reimbursed gradually for those improvements.

Mr. ANDERSON. Are there any further questions? If not, we will take up the next item.

Mr. JUMP. Doctor Ball and Doctor Langworthy are here to present the estimates of the Bureau of Home Economics.

TUESDAY, NOVEMBER 28, 1922.

BUREAU OF HOME ECONOMICS.

STATEMENTS OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, AND DR. C. F. LANGWORTHY, CHIEF, OFFICE OF HOME ECONOMICS.

Mr. ANDERSON. The next is the Bureau of Home Economics:

Salaries, clerks—two of class three, one of class two, one \$1,320, one \$1,260, seven of class one, three, at \$1,100 each; messenger boy at \$480; messenger boy or laborer, \$480; charwomen—three, at \$470 each; two, at \$230 each; in all, \$21,760.

PLAN OF REORGANIZATION.

Doctor BALL. The department is asking as a part of its reorganization plan that the scientific and research work which was formerly incorporated in the States Relations Service be removed and that the work in home economics be made an independent bureau.

In asking this the department is not ready at this time to outline what the final reorganization of the home economics work will be. It is the intention of the department to call in a committee of experts on the different phases of the subject and to ask them to consider the organization of a program of development of this work and to try and fit that work into the present organization of the Department of Agriculture. In its broadest aspects a home economics department would be as big as the whole Department of Agriculture, but it would cover practically the same lines of work the department now does; so instead of organizing home economics as a bureau covering all of those phases of the work the idea would be to make the Bureau of Home Economics the center organization which would cooperate with the other bureaus to make the full and complete field of woman's work.

For instance, we have in the Public Roads a division of agricultural engineering. The Department of Home Economics, as fully developed, would have a division that would consider equipment of the home, especially the machinery of the kitchen, and that work could be handled in cooperation with the Scientific Engineering Division with special applications to the woman's problems. The same thing is true in the nutrition work. There will be certain phases of the nutrition work which will be purely related to the food of man, but in a very large percentage of nutrition problems there will be no difference in method or application between the studies carried on for the benefit of man or the domestic animals. Therefore it is probable that most, if not all, nutrition work, except special adaptations in foods and cooking, would be handled cooperatively under the Bureau of Home Economics.

In the same way we would find that as you organize and develop the home economics work, combining it with the work of agriculture, you would find a very small amount of it needed to have special developments of its own. It simply means organizing that work and applying all of it to the problems of the home. There will be certain other phases in which there will be no change needed and the work will be continued as at the present time.

Mr. BUCHANAN. What phases are not receiving attention now?

Doctor BALL. I would not say that there was any particular phase receiving no attention; but take, for instance, the equipments, which is probably one of the phases in which substantial advances could be made—

Mr. BUCHANAN (interposing). Equipment for the home?

Doctor BALL. Equipment for the home; the mechanical appliances in the home are receiving practically no attention at the present time. The major research problems of the Office of Home Economics up to the present time have been the nutrition problems and the textile problems. This work rested largely on the utilization of agricultural production and so, of course, the nutrition and textile problems

came to be the major feature of the work. Home economics from the standpoint of our institutions, from the standpoint of building up rural communities, has a much broader scope than that. The agricultural economists would like to have us change the name and make a division of home economics, involving the economic factors. This is a phase of the work that has had little development.

Mr. MAGEE. This is new?

Doctor BALL. This will be one of the features to be developed.

Mr. MAGEE. You do not have an office of home economics now?

Doctor BALL. It is now under the States Relations Service.

Mr. MAGEE. Then you would take it out of States Relations Service and make a bureau of it?

Doctor BALL. Yes; take it out of States Relations Service and make it a bureau. The Secretary has already announced that he proposes to put at the head of this work a woman of outstanding research, ability, and of national reputation.

Mr. MAGEE. You are asking for the same appropriation for this year?

Doctor BALL. Yes; and in asking for this we do not wish to be misunderstood. We are not ready at this time to outline any program of development of this work. This is a continuation of the work that is now going on, with the hope that we will be able to strengthen this work where it should be strengthened, and probably eliminate certain work which should be eliminated.

The work, you understand, has been developed under States Relations Service, and the development of it has been along the lines helpful to extension, but the Secretary is coming to feel that the real function of the Department of Agriculture is in the research field, as the States now have well-developed extension programs.

Doctor Langworthy will discuss the organization of the bureau and the work to be done.

GENERAL STATEMENT OF WORK.

Doctor LANGWORTHY. Speaking for the present organization: As I recall it, Mr. Chairman, the appropriations for the Office of Home Economics have been made to enable the Secretary of Agriculture to study the use in the home of the agricultural products for food, clothing, and other purposes, and labor incident thereto. The work of the office has been organized along those lines.

Nearly three-fourths of the total sum appropriated for the Office of Home Economics—\$50,000 for each of the last two fiscal years—has been expended for work concerned with food and its uses in the home. Much of this is technical laboratory work and all of it generally recognized as highly desirable. Some of the work is an application of statistical methods to problems of dietetics, with the result that rational or "balanced" food selection can now be offered to home makers in nontechnical as well as technical terms. In other words, food selection and meal planning can now be easily discussed with an accuracy formerly difficult except for the expert student. Such a generalization has been often attempted, but never in so workable a form as that provided by the Office of Home Economics. Attention has been given to devising graphic methods of summarizing and presenting such data.

Following the usual custom of the Department of Agriculture, results of this work with food have been made public in technical and professional papers and also, when suitable for the purpose, in a non-technical form useful to the women in the home. They have been used also to a very great extent in answering inquiries received from housekeepers and others interested in home problems.

The studies of canning, drying, and other methods of preserving food by household methods, and of problems of cooking, of the use of fuels, etc., are organized to supply definite data on which successful practice must rest, and also to provide reliable directions so stated that they can be readily followed by the housekeeper. Considerable research work and other material has been reported in papers published in professional and technical journals, in accordance with department procedure.

Studies of the thoroughness of digestion of foods has also been continued. Research in household labor problems has been continued, the respiration calorimeter being used for determinations of energy expenditure. The results provide exact data not hitherto available regarding the demands on a woman's strength which household tasks involve. Without such data one can not discuss in definite terms the important question of work in the home. The methods followed are also admirably adapted to the study of the relative value of household appliances intended as labor savers. In fact, it is hard to say how such questions can be studied as they should be without such measurements.

The use of household equipment for the purpose of saving labor was included in this problem, the outcome being that a working surface too low or too high to fit the housekeeper was found to cause a greater expenditure of energy than the use of one the right height; that is, one on which the hand will rest lightly when the arm is dropped to the side and the fore-arm raised to an angle of 45° from the body. The manufacturer of sinks and kitchen tables has been quick to take up this conclusion, as have the housekeeper and the teacher. Besides this there is, of course, a field in household labor for the engineer and the mechanic. The plan of work in the Department of Agriculture, as Doctor Ball has pointed out, provides for this elsewhere, along with problems pertaining to central heating, water supply, sewage disposal, and other engineering questions related to the home.

There are other phases of household management regarding which we have been collecting information, partly from laboratory studies and partly from surveys and statistics of actual home practice. Closely related to these are the problems of economics in the home. These have been studied chiefly by means of surveys and the analysis of statistical data which are provided by them. It is difficult to separate the farm and the home in considering these questions of the management of income in the farm home, and so it is natural that in survey work and interpretation of statistical results we should have been working in cooperation with the Bureau of Agricultural Economics.

The wise use of money is an important household management problem, and this question has received consideration, particularly with respect to the wise selection, suitable care, and repair of wearing apparel, furniture, and other articles of personal and household

equipment. In so far as possible, laboratory studies have been made of the materials and operations involved, and critical examination made of available literature, and as a result some information has already been made public and considerably more awaits publication. A practical outcome of such work is that it enables the housekeeper to save money by prolonging, without undue labor, the usefulness of clothing and household equipment. For example, good household ways of mending china and wood have a technical as well as an economic interest. To learn why some cements, for instance, are superior to others in mending porcelain will take one far into physics and chemistry.

STUDIES OF THE ORIGIN AND DEVELOPMENT OF THE HOME AND ITS EQUIPMENT.

The Office of Home Economics has done considerable work in the collection of material for the discussion of important problems such as the origin and development of the house and its equipment, of the manners, customs, and social usages, since these in great measure determine the distribution of the income in household expenditures, and are equally important in the discussion of the whole question of household management. The time available for such work has been limited, but nevertheless it has been carried on to such an extent that some generalizations at least can be made.

Special equipment, such as apparatus for the study of accelerated wear, is a necessity if one is to study the question of relative durability or wearing quality of textiles and other materials. I believe that all who are familiar with the problem would agree that the development of such devices is time-consuming and costly and that nothing of the sort has yet been provided which is entirely satisfactory; and, furthermore, that it is not possible to discuss such questions except relatively until such measurements are possible. It is a step forward in the march or research to reach a point where one can see the way. That point has been reached and useful work can be done. The cost will be considerable in terms of money, and it seems to me that the development of such equipment might suitably be a cooperative project in which several Government agencies should unite.

In the experimental work carried on with food, mention should be made of the study of food storage problems in which the respiration calorimeter is used, a kind of work which is highly technical. However, it provides data immediately useful to those interested in commercial cold-storage problems, and also which will prove very important in the questions of farm and home storage. The case is a parallel with that of canning, pickling, and brining, and dehydration of food, projects which demand and are receiving special study from the wholesale or manufacturer's standpoint, from the household standpoint, and in some cases, at least, from the farm standpoint as regards quantity. While it is true that in such cases the fundamental biological, chemical, and physical principles can be studied independently of the application, wherever facilities are available, the application of the principles and experimental study of the procedures requisite in each case are of great value. Since procedures and equipment desirable differ with the quantities of material used, there is as distinct a field for such study and research on home problems as there is for those which concern the large manufacturer.

So in the case of these respiration calorimeter studies of storage problems there will be a field for the home worker, even if it should come about that those interested in commercial problems should adopt these methods for their own particular line of work. There is no doubt that they are applicable to problems of home storage, of such products as potatoes and other vegetables and apples and other fruits—so commonly stored for winter use in the farm home; and that they have a relation to the ventilation and handling of the household refrigerator.

Research to be successful depends not only on the individual problem studied and the means employed for that study—it calls also for a broad outlook, vision, and understanding in order to select the problems. The office of home economics tried to shape its work with this broader end in view and has endeavored to get the maximum of result obtainable under the conditions in which it has worked. It has tried so far as in it lies to give the housekeeper the information which she has asked for and to serve also the professional worker. It has also endeavored, as have all branches of the Department of Agriculture, to contribute to the extension service of the department in such ways as it could. But over and beyond this has been the desire to add to the sum of knowledge bearing on the home and its problems, in order that the housekeeper may the more easily achieve a better result.

That we have been successful in some of our efforts I think is borne out by this simple illustration.

The study of food preparation has not had for its purpose the preparation of delectable dishes, although that is something that we could always do and please a very large public, but it has had this, to find the principles upon which the preparation of food should be based, not only that a palatable dish may result, but also that a larger part of the food value may be conserved.

And we have also tried to find some way of making sure that the housekeeper could choose the foods to form a "well-balanced" diet, as people like to call it, so we could give some advice to the housekeeper which would not require detailed information in physiology and chemistry of food and nutrition to enable her to pick the foods to enable her to take care of her family, and not result in ill health.

Mr. BUCHANAN. There is administered under the Department of Labor the maternity bill, that carries on work along the same lines that you have outlined. Is there any duplication of work as between your departments?

Doctor LANGWORTHY. There is always friendly relations between this work and that we have carried on, but we do not do anything that is as intimate in the relation to the home as the maternity bill.

Mr. BUCHANAN. Do they take advantage of the information that you are able to give them?

Doctor LANGWORTHY. I am sure I am right in saying that they take advantage of such information as we have published, but before it would reach the person to be benefited, under the maternity bill the facts would be restated.

Mr. BUCHANAN. But what I am trying to get at, I would like to see whether these investigations, or what not, scientific facts, truths, with regard to nutrition as applied to the young mother and the child, or young mother, during the prenatal days before childbirth, I would

like to find out whether your bureau is undertaking to cover that subject, or that bureau is undertaking to do it, or whether the two bureaus are undertaking to cover the same subject.

Doctor LANGWORTHY. No, sir; we have never done that.

Mr. BUCHANAN. Well, it has been done in other instances, and I was wondering whether there was any duplication of that work in your bill.

Doctor LANGWORTHY. It would not be done in the office of home economics because all of those problems are involved and are connected with the study and practice of medicine; and we would not undertake work in such a field. So far as I am concerned, that work would not be considered in connection with the office of home economics. The work in connection with the feeding of the expectant mother, and the feeding of the young child, and the feeding of the mother and her child after the child has been born, has so far received attention in the Children's Bureau—all that it has received in the Government so far as I know, unless the Public Health Service may have done something.

That reminds me: There has been a publication, that I recall, Mrs. Max West is author of a bulletin on feeding young children. In it she made some statements with regard to general nutrition, and she sent the manuscript down to us to see if she had stated them well. As a special subject of research I am sure that I am safe in saying that there has not been any such duplication as you fear.

Mr. BUCHANAN. My object was to ascertain whether or not in the event that would be gone into, if you have the facts already, whether they would get the facts from you, and use the information you have already collected.

Doctor LANGWORTHY. Yes, sir; the Red Cross is an organization, an independent organization which has always worked with us in the way you suggest.

Mr. BUCHANAN. The Red Cross is not trying to build up an organization, especially, like some of these Government bureaus are. I think without any question, some of them are, and I would say that all of them are.

Doctor LANGWORTHY. I can only speak, of course, for myself. As I say, if you left it to me to decide, I should not want to take any of their functions, in any way, and if I had a piece of information and they asked for it, I would give it to them. Would not that be about what you would naturally expect?

Mr. BUCHANAN. That would be what I would expect.

Doctor LANGWORTHY. Yes; that would be just the way I would feel about it.

Mr. BUCHANAN. I guess it is our duty to see that there is no duplication.

Doctor LANGWORTHY. We have always thought that the relation, the friendly relation between individuals and between bureaus in a department, and between different departments, was one of the very satisfactory things about carrying on the work.

For instance, the study of the use of home equipment and textiles, which is carried on to some extent by the Bureau of Standards, but for entirely different purposes—they have instituted it from a manufacturing and trade standpoint—has yielded material which could be interpreted in household terms, and that we have tried to get and

tried to use. The Bureau of Standards has been extremely willing to work with us in that way. We had one piece of research work some years ago on cleaning silver for which the department had no equipment and for which the Bureau of Standards had equipment, and a cooperative arrangement was arrived at by which one worker from the Bureau of Standards and one from the office of Home Economics studied the problem at the Bureau of Standards. Thus we obtained material for a useful publication and the Bureau of Standards, through that cooperation, developed an entirely new line of research which proved very valuable to it. I can multiply instances of that kind. I would rather, if I could, give you an idea as to the spirit under which we have tried to do the work.

SALARIES.

Mr. ANDERSON. Very well. Now, on page 297 you have a statutory roll, which I assume is made up entirely from the transfers from States Relations Service.

Doctor LANGWORTHY.* It is the same in content as has been in States Relations Service. There is no essential change and it covers the same projects.

Mr. ANDERSON. Now, you propose in your general language, in the Bureau of Home Economics, to eliminate the language, "Cooperation with other bureaus of the department." Why do you cut that out?

Doctor BALL. Simply because it is unnecessary. All bureaus cooperate. The language is not necessary. It might be necessary in providing for cooperation with other departments, but it is not necessary here.

Mr. ANDERSON. If there are no further questions on this item, we will take a recess until 10 o'clock to-morrow morning.

WEDNESDAY, NOVEMBER 29, 1922.

ENFORCEMENT OF INSECTICIDE AND FUNGICIDE ACT.

STATEMENT OF DR. J. K. HAYWOOD, CHAIRMAN OF THE BOARD.

Mr. ANDERSON. Doctor Haywood, we will take up your item on page 300, for the enforcement of the insecticide act.

Doctor HAYWOOD. Mr. Chairman, I have a short prepared statement, which presents this matter in a concise way, and I believe it will make the discussion shorter if I am permitted to submit it.

GENERAL STATEMENT OF WORK.

Mr. ANDERSON. You may proceed with your general statement.

Doctor HAYWOOD. The insecticide and fungicide board, composed of four scientists representing the Bureaus of Chemistry, Plant Industry, Entomology, and Animal Industry, and working in cooperation with those bureaus, was organized in the department to assist the Secretary of Agriculture in the enforcement of the act.

The insecticide act places upon the department the responsibility for preventing the manufacture, sale, or transportation of insecticides and fungicides (including disinfectants) which are below the strength claimed for them, which will not accomplish the results promised, which are injurious to vegetation when used as directed, or those which fail to comply with any other provision of the act, the purpose being to require that labels shall contain only truthful statements and that the materials shall not be adulterated. The products designed for the use of farmers, fruit growers, market gardeners, and stock and poultry raisers constitute the most important class which comes within the purview of the act. Products used to rid the household of insects, and disinfectants, germicides, etc., used to kill or combat bacteria, also come within the scope of the work.

The act has been in effect since January 1, 1911, and its enforcement has resulted in greatly improving the quality of proprietary insecticides and fungicides and in making the labels truthful representations of their efficiency.

The industry regulated by this act has experienced a tremendous growth, with a consequent increase in the work of the board. It has developed from a side-line business to one attracting the investment of a large amount of capital and the erection of many plants for the manufacture of an increasing variety of preparations. Through the efforts of scientific investigators new methods of controlling insects and fungi have been developed and the industry is of constantly increasing economic importance. The overcoming of losses to crops and animals through the application of proper remedies has come to be regarded as an important part of commercial farming and stock raising, and the use of the materials controlled by this act has consequently become more general and the tonnage entering interstate commerce is now very large.

Another important result of the enforcement of this act which should receive considerable emphasis is that it has proved to be a potent aid in the endeavor of the department to introduce new remedies. By invoking its provisions it is possible to materially assist other bureaus of the department in the introduction of new methods of control treatment, by preventing the sale of materials which purport to be of the standard recommended by the department, but which, in fact, are less efficacious and sometimes positively injurious. By inspecting the material offered for sale in the localities where other bureaus are attempting to introduce new control methods, it is possible to prevent to a large degree the failure of the control treatment, which would follow from the use of materials not up to the standard.

The board is giving special attention to:

(1) Campaigns designed to improve the quality and labeling of Bordeaux mixture and Bordeaux-lead arsenate mixture.

(2) Campaigns against hitherto uninspected insecticides and fungicides falsely claiming to control the cotton boll weevil and falsely claiming to control many insects and plant diseases by inoculation into the tree or by absorption through the roots or seeds.

(3) Campaigns against insect powder adulterated with powdered daisies.

(4) Campaigns against disinfectants which are adulterated or the labels of which bear false and misleading claims.

(5) Campaigns against calcium arsenate which is deficient in active ingredients or contains ingredients injurious to vegetation.

(6) Campaigns against so-called pine oil disinfectants and coal-tar dips and disinfectants which are adulterated with mineral oil.

A number of scientific investigations are under way relative to calcium arsenate, larkspur seeds, nicotine soaps, nicotine solutions, pine product emulsions, paradichlorobenzine, Bordeaux mixture, dusts, dry lime-sulphur, and insecticides recommended against lice on animals, intestinal parasites, and mange, to determine basic facts necessary in the enforcement of the provisions of the insecticide act.

For several years now there has been such a marked increase in the number and tonnage of insecticides and fungicides to be inspected that it is only by an exercise of the strictest economy in all our expenditures that we have been able to give even a fair degree of protection to the consuming public. The time has come when we feel that we would not be doing our duty if we did not frankly state to you that under our present appropriation and exercising the most rigid economy, we do not feel that we are able to give that degree of protection contemplated by the law or rightfully expected by the consuming public.

SALARIES.

Mr. ANDERSON. I want to ask you one or two questions about the statutory roll, covered by the item on page 300. The item appears to be the same, with the exception of the dropping of one messenger boy at \$480 and one at \$360.

Doctor HAYWOOD. Yes, sir.

Mr. ANDERSON. Are those places vacant now?

Doctor HAYWOOD. They are filled now, but we will have to drop those boys.

Mr. ANDERSON. There are no changes in your general expense item?

Doctor HAYWOOD. There is no change whatsoever in the rest of the appropriation.

WEDNESDAY, NOVEMBER 29, 1922.

FEDERAL HORTICULTURAL BOARD.

STATEMENT OF DR. C. L. MARLATT, CHAIRMAN OF THE BOARD.

Mr. ANDERSON. Doctor Marlatt, do you wish to make a general statement before we take up your statutory roll?

Doctor MARLATT. We were asked, Mr. Chairman, to present a statement of the more important work of the board, particularly with reference to the items of the appropriations. I have such a statement here, which I would like to submit for the record. It contains information that may be of use to the committee, covering the general work of the board in its more important phases.

Mr. ANDERSON. You may submit that for the record.

(The statement referred to is as follows:)

GENERAL STATEMENT OF WORK.

The Federal Horticultural Board is the agency for the administration of the Federal plant quarantine act of August 20, 1912. This act has for its objects:

(1) The prevention of entry into the United States of new and important insects or plant diseases injurious to agriculture, horticulture, and forestry.

(2) The prevention of spread in the United States of any such pests which may have gained more or less limited foothold.

(3) The control and, if practicable, the eradication of such pests, either directly or in cooperation with the bureaus concerned.

To give such protection now involves the administration and enforcement of some 22 foreign and 15 domestic quarantines.

A somewhat detailed record is given of these activities in the annual report of the board now in press. This special report for the information of your committee covers the subjects of more general interest and of immediate importance. These are:

(1) Control of important new plant pests, such as the pink bollworm, corn borer, pine blister rust, etc., and (2) the port inspection service for the enforcement of the various foreign quarantines.

CONTROL OF IMPORTANT NEW PLANT PESTS.

The Department of Agriculture is now attempting to prevent the spread and in some instances to eradicate a number of important introduced pests which still have a rather limited foothold. These include, among insect pests, the pink bollworm of cotton, the European corn borer, the gipsy and brown-tail moths, the Japanese beetle, and a number of minor enemies. Among plant diseases similar control is being attempted in the case of the potato wart, white-pine blister rust, citrus canker, and certain diseases of small grains. The present status of the more important of these will be briefly summarized.

The pink bollworm.—This is probably the worst known enemy of cotton, and had gained limited foothold in Texas, Louisiana, and New Mexico. The possibility of eradicating this pest is better now than ever before. No infestation by it was found in 1921 in Louisiana, nor has there been any reappearance determined so far this year, and Louisiana may be looked upon as substantially, if not entirely, freed from the pest.

In Texas, as to the older infestations in eastern Texas, but a single infested boll containing a single larva of the pink bollworm was found in the large Trinity Bay district in 1921. There has been no return of the pest in the Hearne district since the original cleanup in 1917, and this area may now be released as absolutely free from the pest. In the western areas of infestation in the Pecos Valley and in the Rio Grande Valley near El Paso, noncotton zones have never been established, and the pink bollworm reappeared very scatteringly in 1921, as was to have been expected. As long as the outcome in eastern Texas was uncertain, neither the planters nor the State authorities have been willing in these western areas to abandon the growth of cotton in an effort to completely eradicate the pest, but if it can be held to these western areas, which are separated by wide and uncultivated and fairly desert tracts from eastern cotton cultivation, they will present very little greater risk than occurs from the pink bollworm in Mexico.

The situation in New Mexico in the Rio Grande Valley and in the upper Pecos Valley is similar to that in western Texas.

The only new outbreaks by the pink bollworm during 1921 were two very incipient infestations in Ellis and Grayson Counties in northern Texas, originating from shipments of seed from Carlsbad, N. Mex., made prior to the determination by the department of infestation at the latter point. These new outbreaks were immediately and vigorously taken hold of by the State and Federal authorities and thoroughly cleaned up, and noncotton and surrounding regulated zones established for 1922. No infestation of the crop of 1922 near these points has so far developed. They present a situation no more serious than was Hearne in 1917, which was completely eradicated with one year's cleanup.

Up to October 1, 1922, the only recurrences of the pink bollworm which have been determined have been in three fields on the Rio Grande in the Great Bend district. Necessarily in this area, with the possibilities of reinfestation from Mexico, the pink bollworm may be expected to occur in greater or less numbers any year. Fortunately, this area is a very unimportant cotton district and is isolated from other cotton regions.

As a basis for the knowledge of the present status of this pest, very intensive inspec-

tion has been carried out during the present season in the States of Louisiana, New Mexico, Oklahoma, and Texas, involving a total of nearly 2,000 work days. This inspection will continue throughout this year and it is probable that additional points of infestation may be later determined.

As a result of interstate cotton conferences held in Washington and in Texas in 1921, fairly adequate State legislation has been obtained and good cooperation is being had with these States in this effort at eradication.

The real danger will come just at this period when the insect seems to be practically eliminated, and planters and others may come to the false conclusion that it is not necessary to continue the work and cost. The inspection and field work is more necessary and should be prosecuted with more intensity at this stage than at any other if ultimate success is to be gained.

Incidentally, it may be said that this effort at eradication has resulted in the protection at a comparatively trivial cost of the cotton crop not only of the three States concerned, but probably of the entire South, and whatever the outcome of the effort has been tremendously worth while from this standpoint alone.

In the case of the pink bollworm we are now attempting to do what was neglected in the case of the boll weevil in spite of the pointing out of the necessity by this department at that time, nearly 30 years ago.

The scientific and research phases of the subject have been conducted, as hitherto, in the Laguna district, Mexico, and very important information has there been obtained relative to the habits and control of the pest. One important recent outcome of this work is the determination that the pink bollworm can not, as a rule, survive in moist soil. This determination has an important bearing on the clean-up operations practiced by this department in Texas and other States—i. e., the destruction of all standing and scattered cotton and bolls has undoubtedly had much of its success from the fact that any remaining larvæ and bolls have been thus buried and have perished in the moist soil. It has been shown that with infested bolls so buried from 95 to 99 per cent of the larvæ die. This work is being conducted on a very small appropriation (\$5,000), but it is very desirable to considerably extend it, and a fund of \$10,000 was requested for next year (1923-4). This increase was not approved by the Budget Bureau.

The corn borer.—The administration of the corn-borer appropriation has been assigned to the Bureau of Entomology, but in cooperation with this board as to quarantine features. There has been no new outbreak of the corn borer this year. In other words, this pest is still limited, so far as is known, substantially to the areas determined last year, these representing for the most part areas of original infestation from Europe in 1909 and 1910, namely, the New England area, the eastern and western New York areas, and the Ontario area, from which latter it has apparently spread, as determined last year, to the southern and western shores of Lake Erie. There has been during the year a local but limited natural spread of the insect in the case of each of these areas.

It would appear from this record that the quarantine and control measures safeguarding the movement of products from the known infested area have prevented wide jumps of the insect. The funds available, however, for this work have been entirely inadequate for general surveys of other States or areas and no positive claim is made that the department now has information as to the existing distribution of this pest in the United States.

It is very important that the corn-borer work should be continued. There is no question at all as to the importance of this pest of corn. It is a new pest and will be an additional burden on this crop. During the present year it has maintained itself about in the same status as previously in the known areas of infestation, there being certainly no increase of damage in the western areas of invasion in New York, Pennsylvania, Ohio, and Michigan, and, in point of fact, in these areas no commercial damage has ever resulted. The extensive damage which the insect frequently occasions in the New England area seems to be explainable by the fact that the insect is there double-brooded and that the cultural and crop conditions are peculiarly favorable to its multiplication. The Canadian authorities report that the damage in Ontario is very much less than in either of the two previous years. This is supposed to be due to better cultural conditions and also to the late planting of corn.

The menace of this pest to the main corn areas of the country is still to be determined. It may prove to be a very serious pest when it reaches the great Corn Belt and particularly when it gets into the more southern regions of corn culture. It can certainly always have a very serious phase in connection with table corn for immediate consumption or for canning, and in exceptional seasons with flint and possibly other corn, unless efficient control by natural enemies or other means develops. There is therefore every reason to continue and adequately support the quarantine work to prevent spread.

The effort during the current year to divide the cost of the work between the States concerned and the Federal Government has been only partially successful. Fairly adequate support and cooperation has been obtained from approximately half of the States concerned and varying support more or less inadequate from the other States. It becomes, therefore, a question to be seriously considered whether in a menace of this kind, which affects the whole country, protection should be jeopardized by conditioning the necessary quarantine and inspection work on the support of any State or States out of a series; in other words, the neglect or failure of any State may negative both the efforts of other States and of the Federal Government.

The situation is very similar to that in Texas 30 years ago when the boll weevil first appeared, and when it was neither possible to arouse the Texas Legislature nor the farmers to take protective action which at that time would have been a fairly easy and simple proceeding. In other words, it has repeatedly proved difficult to get a State where an insect has not yet reached the stage of causing material damage to become sufficiently interested to cooperate in funds and work. It would seem clear that the necessary control measures should be instituted in connection with such State until such time as the State has become fully aroused to the need by educational and other means.

The Japanese beetle.—The Japanese beetle quarantine fund is also being administered by the Bureau of Entomology, the board cooperating in quarantine features. It seems desirable here to emphasize the belief of the board that this pest is one of the most dangerous insect introductions made in many years, and threatens large future losses, particularly to fruit and forage crops, to the latter as a grub infesting the soil. This beetle seems to be still limited to the original area of infestation, except for the natural spread of some five miles a year. In the center of this area, where the insect has become most abundant, the damage to foliage and fruit is very alarming. The ease with which the insect may be carried with produce is also a very disquieting feature; for example, during 1921, out of some 200,000 baskets of sweet corn moving out of the district and subject to inspection, upwards of 5,000 beetles were removed. The insect may be carried by almost any of the farm, garden, florist, or nursery products moving out of the district and in addition is a strong flier.

The quarantine and control work against a pest of this kind can be justified only by the repression of spread and lessening of damage secured. There is no question at all but that this pest will in time spread throughout the United States. The prevention of spread is of immediate value and gives a period during which the insect can be studied and its means of control more fully determined, and more particularly affords opportunity for the introduction from its original home of natural enemies. From this point of view the department would seem fully justified in maintaining for the present the quarantine and other control of this pest which is now in operation.

The gipsy and brown-tail moths.—The quarantine control of the gipsy and brown-tail moths is in cooperation with the Bureau of Entomology of this department. The quarantine on account of these two pests has been twice slightly modified during the year. The quarantined area has been extended with respect to the gipsy moth, but with respect to the brown-tail moth it has been possible to reduce very materially the area quarantined on account of this insect.

The new areas determined as infested in New Jersey, New York, and Pennsylvania in 1920-21 remain as formerly under the control of State quarantines, no Federal action having been taken, inasmuch as these State quarantines are being administered in active cooperation with the officers of the Bureau of Entomology of this department. The scattered points of invasion in Pennsylvania, New York, and New Jersey, which resulted from the big central colony at Somerville, N. J., have been apparently eradicated. The Somerville colony has been subjected to thorough clean-up and control work now for two seasons, and the outlook is good for the eradication of this pest in New Jersey.

Two new points of infestation were determined during the year on Long Island and the clean-up of these areas is actively under way in cooperation with the State officials.

Inspection of products likely to disseminate the gipsy moth has been continued in New England and in New Jersey in cooperation with the State authorities and shipments have been safeguarded by careful examination.

The pine blister rust.—The Federal quarantines on account of this disease are being administered in cooperation with the Bureau of Plant Industry. The important development in the white pine blister rust situation was the discovery in the fall of 1921 of the establishment of this disease in southwestern British Columbia and in the Puget Sound region of Washington. The department in cooperation with State and Canadian authorities took prompt action to determine the extent of the infected area and to control or eradicate this new outbreak. The condition of the infested pines indicates that the disease must have been present in British Columbia as early as 1911.

The infection is widely distributed on native western white pine and cultivated black currants in British Columbia, the most important location being at Revelstoke, about 120 miles north of the State of Idaho. This year, cultivated black currants infected with the rust have been found in Washington in the counties of Whatcom, San Juan, Skagit, Island, Clallam, Pacific, and a single infected planted pine (*Pinus monticola*) was found at Blaine, Wash. In 1921 two small pines infected with blister rust were found in a nursery at Mount Vernon, Wash.

A Federal quarantine was established, coinciding with the Washington State quarantine, and including the known infested area, to prevent the movement of five-leaved pines and currant and gooseberry plants out of that portion of Washington lying west of the summit of the Cascade Mountains.¹

As to the eastern areas of blister-rust invasion, Federal Quarantine 26, which prohibits the movement of blister-rust host plants from States east of and including Minnesota, Iowa, Missouri, Arkansas, and Louisiana, interstate to points west of the quarantine line, has been continued to prevent the introduction and spread of the disease into uninfested regions. In the enforcement of this quarantine 70,180 shipments of nursery stock were examined for blister-rust host plants during the past year. There were intercepted 135 shipments in violation of the quarantine, 93 per cent of which were returned to the consignor and the remainder disposed of by consignee or State officials. The number of violations by nurserymen was reduced from 81 per cent in the spring of 1921 to 50 per cent in the spring of 1922. The increasing effectiveness of the quarantine is shown by this marked reduction in the number of violations by nurserymen. Practically all violations by nurserymen are found to result from neglect or carelessness on the part of nursery employees. This condition has been corrected through improved methods when brought to the attention of nurserymen. Violations by individuals not in the nursery business are invariably committed through lack of knowledge of quarantine regulations. In conducting quarantine inspection work the department has received excellent cooperation from the Post Office Department, common carriers, nurserymen, and State officials.

The potato wart.—The European potato wart is still restricted in the United States to about 800 gardens situated entirely in mining villages in the States of Pennsylvania, West Virginia, and Maryland. Nearly all standard American potato varieties have been tested for reaction to wart and many immune varieties have been determined so that this disease does not now have the menace to this country which it originally had. In the invaded districts these immune varieties are now for the most part being grown under regulations enforced by the States concerned and the danger from these districts is thus being very greatly minimized.

A large volume of work has been accomplished in a study of this disease both from the technical standpoint of the disease itself and its control and also the determination of the reaction of varieties of potatoes to it as to immunity. It is proposed, after this year, to discontinue much of the research work which has hitherto been carried out by the board in cooperation with the Bureau of Plant Industry. An appropriation for the board for the next fiscal year has been asked for of only \$5,000 for cooperation in quarantine work and for some essential survey work. It is understood that the Bureau of Plant Industry will continue such technical research work in connection with the disease as may be necessary.

The board does not feel, however, that the time has come when it is either necessary or desirable to open the ports of the United States to the importation of foreign potatoes from countries known to be invaded by this disease. Such action would probably result in the extension of this disease to practically all the potato regions in the United States, and might very shortly involve a very serious consequence where the nonimmune rural group varieties are the main dependence.

DATE SCALE ERADICATION.

There are approximately 20,000 imported date palms now planted in orchards in California, Arizona, and Texas. These special date districts include Coachella and Imperial Valleys in California, Yuma, and Salt River Valleys in Arizona, and a small garden at Laredo, Tex. In addition to these planted orchards there are some 12,000 offshoots recently imported from Algeria and Egypt, now being grown in four quarantine nurseries—two in Indio, Calif., one in Yuma, Ariz., and one in Phoenix, Ariz. All together there are approximately 200 date plantations in the United States, of which 14 are still infested with the *Parlatoria* date scale. Several of these infested

¹ Owing to a recent change in the Washington State blister-rust quarantine, it has become necessary to extend the Federal quarantine to the entire State of Washington, instead of only that portion of the State west of the summit of the Cascades.

orchards have been almost completely cleaned up during the year, but others are still seriously infested, and among them are half-a-dozen orchards which contain large-sized palms which require repeated treatments over a considerable period to thoroughly eradicate the scale.

The 12,000 recently imported offshoots are all under close observation, and many of them are likely to develop scale infestation later on, even if they are now apparently clean, and these plantings must, therefore, be kept under observation for a considerable period of years before the plants can be taken out of quarantine and distributed.

More than 100 of the date plantations in the United States have been completely cleaned up within the past eight years by the methods now being followed, and it is believed that the remaining infested groves can be similarly cleaned up within the next few years.

The *Parlatoria* scale is so destructive to the date palm that the experts of the Bureau of Plant Industry and all others who have studied the matter agree that dates can not be grown in this country profitably unless the *Parlatoria* scale is completely eradicated. The whole future of this promising industry, which is so admirably adapted to the irrigated valleys of the Southwest, is, therefore, tied up with the success of the *Parlatoria* eradication work. Several million dollars have already been invested in date culture and the industry is a rapidly growing one.

During the past year a very efficient corps of date scale inspectors has been trained, and rapid progress is being made in the work of eradication of the scale. The State and county officers of California and Arizona have given most thoroughgoing cooperation in this campaign of eradication.

PORT INSPECTION SERVICE.

Of particular importance at this time is the strengthening of the port of entry inspection service for the enforcement of the various foreign quarantines. This service is the first line of defense and represents a very important and rapidly growing activity. The enforcement of foreign quarantines must primarily be carried out at the ports of entry of the United States. It involves the inspection, in cooperation with customs officers, of vessels arriving from foreign countries for the purpose of excluding plant pests with plant material brought as cargo of such vessels or by passengers or crews. In the case of Mexico, it involves the control of freight and other traffic between that Republic and the United States, and control to a much less extent on the Canadian border.

Two States, California and Florida, on account of their very important fruit interests, are giving most valuable cooperation and aid in such port inspection work. The State of California is spending in this work approximately \$100,000 a year to protect her great fruit industry, and by collaboration this department gets the advantage of this work at trifling cost. Florida is in a similar status. No other States are taking this same sort of action and the protection at the other ports of the United States is practically limited to work of the Federal Horticultural Board of this department.

The importance of this work may be illustrated by the following typical instance: The examination of the personal baggage of a passenger landing at Baltimore from Brazil disclosed in one of his boxes some fifty-odd packages of Brazilian cotton seed all infested with living pink bollworms. The owner proposed to take the material to the cotton section of Mississippi for planting. Had there been no inspector at Baltimore, this entry would probably have resulted in the establishment in that State and in the South of the worst known enemy of cotton, and would possibly have nullified all the effort which has been going on now for several years at great cost to control and eradicate this pest in its present rather limited foothold in Louisiana, Texas, and New Mexico. This is only one illustration of hundreds during the year of the interception of pests threatening many of the major fruit and field crops of the Nation. These interceptions have included such important pests as the corn borer, citrus canker, pink bollworm, various fruit flies, including the Mediterranean, potato weevils, and many others of both known and unknown possibilities. A total of 397 different kinds of insect pests have been thus intercepted and identified, together with 175 others, the specific identification of which it has been impossible to make. This service is now much undermanned and long hours are involved, and at important ports only partial inspection can now be made, and other ports are without any protection of this sort whatever.

In connection with this inspection of imported plants and plant products it is very important that provision be made for cooperation with the Post Office Department for the examination of parcel-post packages from abroad. The postal inspectors are not

trained to make such inspections, and such parcels very frequently have been found to contain the very pests which the department is making a valiant effort to exclude from this country or exterminate, and inasmuch as such parcels may go directly to the interior points for customs examination and distribution they present an exceptional menace. There are some 25 border and interior points for the examination of such parcel-post packages in the United States. The board now has inspectors in connection with other port duties at only 11 of these points. Protection of this sort is work of a continuing nature and must be carried out efficiently and adequately and is, therefore, on a different basis from work which may be postponed or materially reduced to be resumed later. In other words, a single introduction such as the specific example given above would cost the country hundreds of millions. The likelihood of such introductions can be largely eliminated if adequate inspection is made possible.

The port inspection service as now being conducted covers particularly the ports of Baltimore, Boston, New Orleans, Philadelphia, Portland, and Seattle, and involves the inspection of the ocean commerce entering these ports. The service, however, is very inadequate at all of the Atlantic ports listed and should be extended to other Atlantic and Gulf ports.

An additional very important feature of the inspection service of the board is the inspection at the quarantine house of the department of plant materials imported from all quarters of the world under special permits, and also the importations of new plants and seeds made by this department. In connection with this work a total of 12,732 shipments of plants and plant products were examined by the local inspection service of the board. Of this number 426 represented special plant introduction importations under the provisions of quarantine 37. The others represented departmental importations, or inspection and certification of plants and plant products of domestic origin arriving in or leaving the District of Columbia.

Nearly 2,000 of these shipments came through the parcel post.

THE MEXICAN BORDER CONTROL.

The Mexican border control to prevent the entry of the pink bollworm from Mexico and for the enforcement of various fruit and grain quarantines against Mexico is properly a part of the general port inspection work, although carried out under certain special and additional powers authorized in the language of the specific appropriation for the purpose. On account of the relationship of this work to the general administrative work of the board in connection with such port of entry control, in the estimates for the fiscal year 1924, the appropriation for the Mexican border work and the language authorizing it have been transferred from the general pink bollworm appropriation to the administrative appropriation for the board. It is important that the language giving specific authorization for the exclusion of cotton seed and the pink bollworm should be retained in connection with this item.

The prevention of the movement of cotton and cotton seed from Mexico into the United States in connection with railway cars and other vehicles, freight, express, baggage, and other materials from Mexico has involved for the fiscal year ended June 30, 1922, the inspection of 35,747 freight cars, of which number 31,579 were fumigated. At Del Rio, Tex., where there are at present no railroad connections, 31,861 vehicles of various descriptions were examined, 69 of which were fumigated on account of the presence of cotton seed at the time of inspection.

In addition to the control of freight and other traffic, the inspection at the footbridges in cooperation with the customs officials located at Brownsville, Laredo, Eagle Pass, and El Paso, Tex., as well as on the boundary line at Nogales, Ariz., resulted in the interception of a total of 5,511 pieces of contraband material during the last fiscal year as follows: Avocados, 13,422; corn, 4,971; cotton, 1,797; grapefruit, 519; guavas, 2,842; limes, 2,106; mangoes, 1,550; oranges, 8,073; peaches, 8,037; plants, 5,601; plums, 882; potatoes, 951; sapotes, 142; sugar cane, 3,967; sweet potatoes, 651.

The amount of car fumigation and other work involved increased very greatly during the last fiscal year, due to the improved conditions in Mexico, and the corresponding increase in freight and other traffic between Mexico and the United States. As a result of this, it became necessary to call upon Congress for a supplemental appropriation, and \$50,000 was so appropriated in connection with the urgent deficiency bill approved March 20, 1922. As noted the moneys so expended very largely are returned to the Treasury of the United States from the charges made for such car and other fumigation—charges based on the cost of chemicals and labor involved. Fumigation fees amounting to \$126,350.50 were collected and turned into the Treasury.

SALARIES.

Mr. ANDERSON. We will take up your statutory roll on page 304. It appears to be the same as before, except that you drop one clerk of class 1, and one messenger or laborer at \$720.

Doctor MARLATT. That effort to reduce the statutory roll, I think, has been explained.

Mr. ANDERSON. This was in accordance with the general policy?

Doctor MARLATT. Yes, sir; it was in accordance with the general policy.

FOR PLANT QUARANTINE WORK.

Mr. ANDERSON. We will take up the item on page 305.

Doctor MARLATT. The portion in italics on page 305 is transferred from the pink bollworm appropriation, which comes later on under the miscellaneous items.

Mr. ANDERSON. It brings the language of the appropriation up into this general item?

Mr. MARLATT. Yes, sir. It is very important that this language should be preserved substantially as it was, because it is under this language that we have authority to control the border situation between Mexico and the United States. We have not that authority anywhere else. We do not have it, for example, under the plant quarantine act.

Mr. ANDERSON. There is no change in the language. It is the same as it was in the other paragraph.

Doctor MARLATT. Yes, sir. It should be changed very slightly in the way of punctuation, as I have indicated here in my copy. The item includes a series of statements separated by semicolons, and this addition should be separated in similar manner by a semicolon. I have inserted the words "provided that" here [indicating] to make the statement a little more logical. If there is objection to these verbal changes you can accomplish the same correction by simply putting in a dash instead of the semicolon following the word "thereof." Then there would be no change in the language at all.

Mr. ANDERSON. I do not think there will be any difficulty about that.

There appears to be an increase of \$70,000, as shown on page 57 of the notes.

Doctor MARLATT. This increase is explained in part in the notes submitted with the estimates. The increase of \$70,000 includes really two items, one an increase of \$50,000, for the Mexican border control explained in note (b), page 59 of the "explanatory notes and statements," and the other \$20,000, explained under note (a), for the extension of the port-inspection service of the board.

INCREASE FOR PORT INSPECTION SERVICE.

The argument for the port inspection service, I think you know. This service is a very essential part of the administration and enforcement of some 39 quarantines. The principal item of expense is in connection with the enforcement of foreign quarantines at the ports of entry in the United States. We have to maintain at these ports inspectors adequate to carry out the inspection necessary

under the quarantines, and particularly in relation to products that are imported in quantities. For instance, we inspect and disinfect all imported cotton, and that has amounted to nearly 600,000 bales in one year. The average is about 300,000 bales a year. It is one of the large items of import of the United States. All of that cotton must be disinfected under our supervision. Similar inspection applies to all other foreign plant products that are under restriction. It includes nursery stock, a great many fruits, some grains, corn, and cereals from the Orient, all of which requires inspection and some of it disinfection. We have had to supplement the funds for that purpose by using pink bollworm funds on that work, that being done on the ground that a portion of the inspection had relation to the pink bollworm.

Mr. ANDERSON. It seems to me that the combining of those two appropriations is a rather doubtful proposition. I suppose there is a certain amount of relation between the border control work and the general inspection of importations of nursery stock, but I think it would be better policy to maintain this whole border business as a separate item.

Doctor MARLATT. That is a matter about which I do not feel very strongly, Mr Chairman, but the argument for the change is a perfectly good and logical one. The border control work between the United States and Mexico relates not only to the pink bollworm but to a number of other quarantines. It is paid for out of the pink bollworm funds, but the men are there, and enforce locally other quarantines, such as quarantines against corn, Mexican fruits, etc. These men, who are being paid out of the pink bollworm funds, are, as a matter of fact, enforcing along the border half a dozen other quarantines. A considerable percentage of their work has relation to the general port of entry enforcement, and the rest is closely related, and that makes it entirely logical and proper to transfer this whole Mexican border work to the administrative work of the board. It is work in port that will necessarily have to go on even after the pink bollworm work has stopped.

Doctor BALL. If we get rid of the pink bollworm, this work of inspection would have to go on just the same.

Mr. ANDERSON. I understand that, but it would be upon an entirely different basis.

Doctor BALL. Do you mean the work on the border?

Mr. ANDERSON. Yes.

Doctor BALL. It would be very much the same.

Mr. ANDERSON. Including all this fumigation of railroad cars, and that sort of thing?

Doctor MARLATT. It would reduce the expense very much.

Mr. ANDERSON. But that is distinct from the pink bollworm proposition.

Doctor BALL. Suppose we should eradicate the pink bollworm, and it looks as if we would, we would still have to maintain the border inspection, including the fumigation of cars and everything of that kind. What we would like to do would be to have our bookkeeping show the amount of money spent in the eradication of the pink bollworm, but after that work is finished, we must continue forever at the work of keeping pests out of the country.

Doctor MARLATT. This work of port inspection involves all the United States, but the cost as to California and Florida is borne by those States. California is spending about \$100,000 in port inspection work, and the Federal Government gets full advantage of it by using the California men. Florida is spending about one-half as much as that in protecting her various ports, and again we get full advantage of her work in the same way. These expenditures indicate the importance which these States attach to that sort of protection. They do it on account of their great fruit interests, which are, perhaps, the greatest in the world—certainly, those of California. Other States have not the same reasons for port inspection in an immediate menace to fruit or nursery interests, or at least do not realize it in the same way. The result is that few of the other States are doing much, if anything, in that sort of work, and the Federal Government is carrying out most of the port inspection work that is being done outside of California and Florida. We are not covering the ground by any means. We cover certain Pacific ports north of California, New Orleans, and in connection with the pink bollworm, some of the Gulf ports of Texas and the Mexican border ports. We cover also the principal northern ports, such as Boston, New York, Philadelphia, and Baltimore. We have one man at Philadelphia, and one at Baltimore. The work is undermanned, and the men are working overtime, frequently 12 or more hours per day. They are enthusiastic young fellows and they are able to do it. It is hard work for them, and we ought to have more men. They realize the responsibility of their jobs and are trying to keep plant pests out of the country.

As an illustration of the value of this work I want to tell you of an inspection incident that happened last spring. A gentleman returning from Brazil, through the port of Baltimore, brought with his personal baggage among other things a small box. Fortunately, we had a man at Baltimore, and the box was opened and found to contain a lot of small plants and wood specimens and some 59 packages of seed cotton and cotton seed. Practically every one of those packages contained living pink bollworm larvæ. This man's purpose was to take these packages of cotton seed to his home in Mississippi for distribution and planting. The carrying out of his purpose—it would have been carried out if it had not been for the department's inspector—would have caused a vast loss to the cotton crop of the South through the introduction of the pink bollworm. It would probably have amounted to hundreds of millions of dollars, and when I say hundreds of millions of dollars I mean two or three hundred million dollars annually. That would have been the cost to the cotton crop of the South. We have many other equally typical cases. We are intercepting that sort of thing all the time. At ports like New Orleans, where many interceptions are made, and where, on account of the favorable climate the danger of establishment of new pests is great, the inspectors go through the passengers' baggage and examine it along with the examination of the customs service.

Examination is also made of the storeroom on the ship, where the ship's stores are kept, and of the personal effects of the crew. Various fruits and vegetables are often found, and in them fruit flies and other pests. Such supplies and stores must be promptly destroyed, and sometimes it is necessary to disinfect the ships. This work does not

cost very much, but the saving effected through the discovery of a single package like that in Baltimore last spring would cover the cost of this work indefinitely.

We want to extend this work and make it adequate. We do not expect at this time to develop inspection at all ports of entry, but we want to extend it to a number of ports where the danger is greatest. We have demands from such southern ports as Savannah, Charleston, and Norfolk, and we ought to have men at all of those places. We ought to have two or three more men in New York City. The work should be strengthened. We do not need anything for California or Florida, because these States are doing the work adequately. The expenditures of these States are over twice the amount of the Federal expenditures in this work, and we are getting the benefit of their inspection.

INCREASE FOR MEXICAN BORDER WORK.

The other item involved in this \$70,000 increase is discussed under explanation (b), page 59. That has relation to the Mexican border work. The cost of this work, as has been explained in previous years, is dependent upon the amount of traffic that goes through the various ports. The very much improved situation in Mexico in the last year or 18 months has greatly increased that traffic, which means that so many more cars, so much more freight, and so much more passengers' baggage crossing the border must be examined and safeguarded. The cost of this work, so far as any necessary disinfection is concerned of freight cars, freight, and baggage, is covered by charges made for the work. The price is fixed to cover, as closely as we can estimate it, the cost of the labor involved in operating the fumigating plants and the cost of chemicals. The big cost is for chemicals, sulphuric acid and cyanide, which we buy in carload lots. That cost, however, is covered back into the Treasury, so that it does not represent an actual loss to the Government.

Mr. ANDERSON. Have you any figures as to the receipts from this fumigation and inspection work last year or so far this year?

RECEIPTS FROM INSPECTION SERVICE.

Doctor MARLATT. I think they are given in the statement which I submitted. They amounted to \$126,000 for last year. We had to get, as you recall, an emergency increase of \$50,000 to carry the work through last year, and this year again we will have to ask for an emergency increase of \$50,000, and to avoid that next year, 1924, the increase is now put into this appropriation.

Mr. ANDERSON. And that makes the appropriation for this particular work the same as the amount expended this year?

Doctor MARLATT. Yes; the same as the amount expended last year and the amount that will be expended this year. I have drafted an item for an emergency increase to cover the balance of this year. The work now is a \$50,000 bigger job than it was two years ago.

The thing I want to emphasize most in connection with the committee's hearing to-day is the need for strengthening the port of entry inspection for the enforcement of these many foreign plant quarantines.

Mr. BUCHANAN. Have you any specific insects or injurious animals for which your inspectors are looking and have you any specific ones by name?

Doctor MARLATT. Yes. Each one of these quarantines relates to a specific pest, that is, most of them relate to one pest.

Mr. BUCHANAN. According to what country they come from?

Doctor MARLATT. According to the country and the product. For instance, we have grain quarantines against pests that are prevalent in trans-Pacific countries, and we control the entry of all grain from trans-Pacific countries on account of various grain diseases.

Mr. BUCHANAN. What do you watch for at the eastern ports?

Doctor MARLATT. At the eastern ports we control the entry of cotton on account of this pink bollworm. We control the entry of all the fruit which comes to us—that is, we regulate it and see that proper safeguards are taken in connection with its entry—all of the fruit that comes to us from the countries and islands south of us, that is, from Cuba, the Isle of Pines, etc., and from all the Central American countries.

Mr. BUCHANAN. In other words, they have some injurious pests in connection with fruit in those countries which we do not have?

Doctor MARLATT. There are two or three quarantines involved in that. Some of them relate to certain fruit flies which occur in the West Indies, Central America, and in Mexico; others relate to other insects—for example, one to what is known as the black fly, which is prevalent in Cuba and the Central American countries and which would be a very serious pest to all the citrus cultures of the south and, perhaps, to the Pacific coast later on. These quarantines, therefore, have for their object the prevention of the entry of some known specific pest or pests. Incidentally our inspectors are on the lookout all the time for things that are not known and not expected.

Several of the worst pests which have come into this country are pests that we did not know anything about beforehand; they come on us as a surprise, but if our men are there they are competent to detect many such pests. For example, the chestnut bark disease, the citrus canker and corn borer were surprises of that kind, but if we had had our existing quarantines in force 15 years ago instead of 10 years ago we might have excluded some six first-class pests, such as the citrus canker, potato wart, oriental fruit worm, Japanese beetle, European corn borer and the camphor scale. This last is a new and very dangerous scale for the South; not only for camphor and many other plants but for citrus orchards. It got in during the period during which we were trying to get plant quarantine legislation. It took four years of effort to get this legislation, and during that period the six very important pests enumerated got in when we had no control and no means of keeping them out.

FOR EXTERMINATION OF THE POTATO WART.

Mr. ANDERSON. We will next take up the item on page 307, to enable the Secretary of Agriculture to meet the emergency caused by the establishment of the potato wart in eastern Pennsylvania, and to provide means for the extermination of this disease in Pennsylvania or elsewhere.

Doctor MARLATT. The potato wart is one of the pests that got in during that period just referred to; as a matter of fact, it came in the year before the legislation was passed by Congress. This was a disease we knew about; it was one of the diseases which is mentioned in the act as one of the reasons for the legislation, but the authority came a little too late. The plant quarantine act became law in August, 1920, but this pest got in during the preceeding winter through a large shipment of potatoes from Germany, which were distributed to mining districts in Pennsylvania, West Virginia, and Maryland. This disease has been under investigation by the board since 1920 under specific appropriations. So far as the work of the board is concerned, it is now possible to relinquish the appropriation except for a very minor item. This is done for the reason that we have completed what we believe is the necessary investigational and control work which should be done by the department at this time. The work that should be carried forward now is such work that the States can take care of, and they have expressed their willingness to do that. If they did not do it we would have to keep the work going, but Pennsylvania has her own internal quarantine which is giving as much protection as we could give with a similar Federal quarantine. Maryland has promised to take similar action. The experimental work under this appropriation has been carried to such an extent that it can be very much reduced, but it is necessary, as stated in the explanation which you have before you, to continue certain phases of the work, and for this purpose \$5,000 is asked.

Mr. BUCHANAN. Are you destroying the wart and getting rid of it?

Doctor MARLATT. The wart has proved to be a less dangerous disease than was anticipated. I do not want to be misunderstood in that. It is just as dangerous as we anticipated for a certain group of potatoes—i. e., for what is known as the rural group of potatoes, which are grown largely in the central portion of the country; that is, in New York, Ohio, and through that district. It is very destructive to this rural group of potatoes and that includes many of our best potatoes, grown over considerable areas. Most of the varieties of potatoes in this country, however, are immune to the disease; that is, other than the rural group, and particularly the potatoes grown in the northern sections, in Maine, northern New York, Michigan, Minnesota, etc., and the potatoes grown in the South. During the course of these years of investigation practically all the potatoes grown in this country have been tested and many important varieties—I should say 70 or more—are substantially or absolutely immune to the disease. That has very much simplified the control of the disease, and it has also relieved a great deal of fear which the disease gave potato growers when it first came to this country.

What the States are doing now in all these districts—and they are all rather limited districts and not commercial potato-growing districts—is to require the householders to grow immune varieties of potatoes. The experts do not believe that it is possible to entirely eradicate the disease by that means, but at least it practically eliminates the risk of the carriage or spread of the disease.

Mr. ANDERSON. This disease is carried in the soil?

Doctor MARLATT. The disease remains for several years in the soil, and it affects also other plants than potatoes. These other plants are affected much less than potatoes, and this disease may not be de-

tected in them, and yet the disease may be there, just as doctors tell us that we have all the germs in us that most people die of, but we do not die—all at once, at least.

It is possible that this disease may attack plants and not be recognized, but it is known that if susceptible potatoes are planted in an invaded district within eight years the disease will probably appear again; in other words, when you once get it into a district it is very doubtful whether you will ever get rid of it. We do not feel that the time has yet come—and we have not done it—to open our ports to foreign potatoes from countries where the disease exists, because that would mean that the whole country might be flooded with potatoes that might carry the disease. We are maintaining our potato quarantine against foreign countries where the disease is known to occur, in spite of the fact that we know the disease exists in limited districts in this country. These districts are, however, not trade districts from which potatoes are exported and they are of little danger to the country as a whole—that is, immediate danger. Furthermore, the movement of potatoes from these districts is prohibited and controlled under State quarantines.

Doctor BALL. That is exactly the same policy which England and France are carrying out at the present time; they have such disease districts and they are holding the disease there.

FOR ERADICATION OF THE PINK BOLLWORM OF COTTON.

Mr. ANDERSON. We will next take up the item on page 331, to enable the Secretary of Agriculture to meet the emergency caused by the existence of the pink bollworm of cotton in Mexico, etc. Doctor Marlatt, I think, perhaps you had better tell us, somewhat in detail, what the status of this pink bollworm is, as we want to keep track of this fellow.

Doctor MARLATT. I have covered that subject in the statement I have submitted, but I will be glad to abbreviate it and repeat it. I have a very hopeful report to make on that pest. I am sorry I can not say, as I did of the potato wart, that we have found any cotton that is immune to it or any district in America that is going to be immune from that pest. In other words, the menace of this pest to the American cotton crop is the same that it has been before, and it is therefore worth our while to continue every effort humanly possible to keep it out and to complete the eradication which now seems to be in a very favorable status.

Last year, and I mean by that the crop year of 1921, but a single pink bollworm in a single boll was found in the large Trinity Bay district, where the insect first got its big foothold. A considerable portion of that district was maintained as a noncotton zone in 1921, but a considerable portion of it was planted, and in the planted area—all of which was under thorough inspection—but a single infested boll was found containing a single pink bollworm. That was mighty encouraging, and that result has come about from the work the department has done in that district since 1918, aided, in large measure, by very favorable climatic conditions, which have helped out the fight. Even when the State failed to come forward, as it did for a year, with full cooperation, it so happened that that year was a year of floods throughout that district and cotton failed to grow; it was drowned out

and destroyed, so that there was very little acreage in cotton in the district. That was a lucky happening and just at the time when it was needed. One of the results of our research work in Mexico—and I mention it here simply because it applies to this eradication plan—is that if you remove all of the cotton plants and all of the surface material you can get and burn it, which is the process we follow, the only remaining pink bollworms in the fields will be those that are in the soil.

They are pressed in with some boll that falls down and gets crowded into the ground or they may crawl into the ground. The experiments in Mexico, referred to, indicate that the pink bollworm larvae will not survive in moist soil but will survive in dry soil. In eastern Texas, during the winter, there is more or less rain and the soil is moist so that with the clean-up and the subsequent death in the soil of the balance of the larvae, due to moisture, it is possible to do pretty effective eradication work as the results have seemed to demonstrate. The only unfavorable factor in that year, 1920, was the discovery of two new points of infestation in two counties in northern Texas. Immediate steps were taken to clean-up these districts and the State having—in the meantime given us a good law and good cooperation—established noncotton zones in these counties, and full control was immediately put into effect.

Mr. BUCHANAN. Have you traced the origin of the infestation in those counties?

Doctor MARLATT. Yes; we know the origin of it in those places.

Mr. BUCHANAN. Where did it come from?

Doctor MARLATT. It came from seed from Carlsbad, N. Mex., before the infestation at that point was determined. Not only did that seed go to those two place but it went to many other places in Texas and everyone of these places has been under the most thoroughgoing inspection for two years, but no pink bollworm has been found at any other place, so that by this time we feel pretty sure that these two places were the only ones where it got a foothold. In explanation it may be said that the infestation at Carlsbad was just beginning, and the chances are that practically all of the seed from Carlsbad was uninfested.

COTTON ZONES FREE FROM FURTHER INSPECTION.

Mr. BUCHANAN. You started this work in 1918 and at that time you did not have full cooperation but since then you have had it. Now, have any cotton free zones been released under your inspection zoning system or transferred from the cotton free system to your inspection system?

Doctor MARLATT. A good many; most of the zones which have been established have been so transferred, and I will come to that in a moment.

To complete what I was saying about these two counties, and the present status in Texas, no infestation has been found the present year, 1922, and the inspection has been so thoroughgoing that we believe we are safe in relinquishing all noncotton zones in Texas for 1923 but still maintaining the districts under regulation so that we can control the movement of the cotton. It is all shipped out of the country. There will be a clean-up this fall in the two northern counties as an additional precaution.

Louisiana, as you recall, had three parishes under noncotton zones for two years, that is, in the southwestern part of the State, and there has been no reappearance of the pink bollworm in those parishes during that time. The discovery of the insect at Shreveport was the only other point in Louisiana. We investigated other points under suspicion, but without finding any infestation. No reappearance of the worm has been found in the Shreveport district for two years; in other words, we have had two years in Louisiana without the pink bollworm, and for 1923 the formerly invaded districts will be under regulation only.

Texas, as already noted, has been free from the pink bollworm with the exception of one specimen last year, now for two years. But this applies only to the eastern area. There is a western area, which is entirely separate, in which the attempt to eradicate the pest has been postponed, not necessarily abandoned, but postponed for reasons I will mention later. The outlook is now most encouraging where work is being done, both as to the main portion of Texas and as to Louisiana. The danger comes just at this time when the work seems to be approaching completion, namely, to have it understood that the cost will be fully as great now as before, because it is essential to keep up the same amount of inspection for one or two years more. To materially reduce or to relinquish inspection work because success seems in sight would mean the loss of the opportunity to eradicate this pest. I do not think I need to enlarge on that because you can see it as plainly as I can present it.

This appropriation is for 1924, which means the crop year after the next, and we do not know what we will have to expend but we have every reason to believe we will have to maintain inspection, and this is the chief item of cost, even if there are no new outbreaks, in the most thoroughgoing manner for at least that period. Therefore, we are asking for the same amount we had last year, less the amount that has been transferred. We look upon that appropriation, as I have said before, as an insurance fund, and I do not use that term in its ordinary signification, but as a fund to be used if needed and we believe it probably will be needed. We have turned back into the Treasury, in former years, very considerable sums, where the money was not needed; in other words, we only use what is needed.

You understand, I think, the arrangement which is made in this appropriation for the cooperation of the States with the Federal Government as to reimbursement to farmers in noncotton zones. The amount of such reimbursements this year is not very great.

Mr. ANDERSON. Is that now permanent law?

Doctor MARLATT. It is in the language of the appropriation act. You will find that at the bottom of page 333, "of which sum not to exceed \$200,000 may be available for reimbursement," etc.

The nature of the reimbursement is specified in Senate joint resolution No. 72, approved August 9, 1921, and I think perhaps that is continuing legislation.

Doctor BALL. It is as it applies to the pink bollworm, but it would not be available for any other insect.

Doctor MARLATT. Oh, no; and as it is tied up with this appropriation, if this appropriation should lapse I suppose that resolution would be functionless.

Mr. ANDERSON. What is the difference between the appropriation carried on page 331 and the appropriation carried on page 333?

Doctor MARLATT. The pink bollworm appropriation is divided into several items. There was originally the item (p. 331) covering the Mexican border situation; then there is an item on page 332, which covers the surveys to determine the actual distribution of the pink bollworm in Mexico and to exterminate local infestations in Mexico near the border of the United States. This appropriation was originally \$25,000. We have never used a large amount of that appropriation, and it was reduced several years ago to \$8,000. Another appropriation is to investigate in Mexico or elsewhere the pink bollworm as a basis for control measures. That covers the technical research work which we are carrying on in the Laguna district, Mexico, where the pink bollworm is most abundant. That is its center in Mexico.

Mr. ANDERSON. And the inspection work is paid for out of the item carried on page 333?

Doctor MARLATT. Exactly.

Mr. ANDERSON. You did not finish your statement with respect to the infestation in western Texas.

INFESTATION WORK IN WESTERN TEXAS.

Doctor MARLATT. There are four points or districts of infestation in west Texas and New Mexico, namely, the important cotton producing area in the Pecos Valley in western Texas; a similar area much farther north in the same valley in New Mexico in the vicinity of Carlsbad; the unimportant Great Bend district, the growth of cotton in which is confined to a few trivial fields at the bases of the hills; and the much more important and recent cotton development in the Rio Grande Valley southeast of El Paso in Texas and northwest of it in New Mexico.

The invasion of the Pecos district in west Texas was due to cotton smuggled across the border from Mexico in the Great Bend area. The invasion of the Carlsbad district was apparently from seed from the Pecos Valley in Texas, and the invasion of the El Paso region in Texas and New Mexico is traceable directly to infested cotton seed brought to the immediate border at Juarez in freight cars and in connection with traffic, and probably chiefly by flight of insects across the river. These sources of invasion, particularly for the Great Bend district and the El Paso region, will continue as long as the insect is abundant in Mexico, and no permanent control can be certainly effected until cooperation with Mexico leads to joint action by that country with the United States. The establishment of noncotton zones, therefore, as to the districts along the Rio Grande immediately bordering Mexico is a rather useless proceeding under present conditions. The establishment of noncotton zones and attempted thoroughgoing cleanup areas in the Pecos Valley in Texas and New Mexico would be possible but the planters of these areas have not been willing to forego the one crop which is their main staple and the State has not been willing to enforce a noncotton zone as to these areas. As long as the whole project of the eradication of the pest in eastern Texas was somewhat on trial there was perhaps some justification for this point of view.

As a result of conferences held in Texas, on which are based the present control operations in eastern Texas in full cooperation with the State and under adequate State law, it was decided that for the

present these four areas in western Texas should be excluded from the effort at eradication, but that these areas should be quarantined and thoroughly controlled and all cotton produced therein should be fully safeguarded both as to local utilization and with the requirement of export under safeguards of the lint.

An important consideration in reaching this decision is the fact that these four areas are all widely separated from the great cotton areas of central and eastern Texas by stretches of semidesert or grazing country, and these areas, therefore, represent perhaps no greater menace or risk to eastern Texas than does Mexico itself. Their control places them, therefore, practically in the same status relative to other cotton production in the United States as though they were part and parcel of Mexico. Ultimately, when the full clean-up of eastern Texas and Louisiana has been completed, it would seem to be highly desirable to take up certainly the Pecos regions in Texas and New Mexico for similar clean-up. Any permanent eradication of the pest along the Rio Grande in the Great Bend district and westward, as already indicated, must be dependent on the cooperation of Mexico in similar work with respect to the contiguous cotton areas in that Republic. ●

Mr. ANDERSON. Can the movement of the crop be controlled with any certainty from the regulated districts?

Doctor MARLATT. Mr. Chairman, I think we have methods of controlling all the movements of cotton grown in these western districts; at least, there has been no infestation which has come from any such movement, and we think that it is pretty adequately safeguarded. It amounts to the prohibition of any movement of cotton seed or seed cotton whatsoever from these districts. The cotton lint is under control until exported. It moves from El Paso or from the Pecos district or any of the other districts directly to the port of export and that means usually the nearest port of export, Galveston, Texas City, or Houston, and these are also within a regulated zone. If it remains at these ports for any length of time it is kept under control in licensed warehouses until it is shipped abroad. Some of the cotton that is shipped abroad may come back, but if any of the cotton from regulated districts comes back to this country it is treated like foreign cotton and must be fumigated as a condition of entry unless it can be shown that it is more than two years old. The insect will not remain alive in the boll over the second year; that is, beyond the second year.

REIMBURSEMENT TO FARMERS IN CLEAN-UP CAMPAIGN.

Mr. ANDERSON. I would like to ask you if you can give us any idea how much of the \$200,000 which is available for reimbursement has been expended or is likely to be expended this year?

Doctor MARLATT. I have a statement which indicates the expenditures under this item for the year 1922; that is, the one that is just completed. We spent \$20,000, taking just the large figures, in clean-up work, at a cost of \$4.50 an acre; that was the average cost. That compares with a cost of about \$9 or \$10 an acre during the war period, when labor was scarce and high. We have been able to reduce this cost largely by contracting for the work with farmers, which was not possible in the old days because the boys were all away and we had to hire labor, transport it, feed it, and house it. The cost

n 1922 is about half what it used to be, and the total expenditure or clean-up during that year was \$20,000.

Under the item for reimbursement, the department is authorized to expend—

not to exceed \$200,000 for reimbursement to cotton-growing States for expenses incurred by them in connection with losses due to enforced nonproduction of cotton in certain zones.

We spent in cooperation with Louisiana in 1922, \$41,000, nearly \$42,000; in cooperation with Texas, \$610. There were large non-cotton zones in Louisiana at Shreveport and in three southwestern parishes, and the expenditure in Louisiana means that the State spent twice as much. I think our expenditure, as I recall, was not to exceed \$5 an acre, or one-third of what the State spent. In Texas the \$60 does not mean that Texas only spent \$1,220, but Texas made most of her reimbursement of planters before this resolution was passed and it was decided that it was not retroactive, so that Texas failed to receive a large payment which otherwise would have been necessary under this resolution.

Mr. BUCHANAN. You say you spent \$42,000 in Louisiana for reimbursement in connection with losses due to enforced nonproduction of cotton?

Doctor MARLATT. Yes; that was reimbursement to the farmers and represented losses due to the establishment of noncotton zones. That means that the State must have spent twice as much under the terms of the resolution. I will be very glad to submit this data for the record.

(Said data follows:)

Expenditures under the eradication item, fiscal year 1922.

| | |
|--|-------------------|
| Clean-up work (\$4.50 per acre)..... | \$20,115.78 |
| Cooperation, Louisiana..... | 41,971.64 |
| Cooperation, Texas..... | 610.00 |
| General reserve (originally \$80,000)..... | 5,000.00 |
| Balance July 1, 1922..... | 8,216.13 |
| Total..... | 75,913.55 |
| General expenses..... | 324,086.45 |
| Total..... | 400,000.00 |

Doctor MARLATT. The plan for 1923 is not to declare noncotton zones for any of the old districts in Texas next year, but all will be maintained as regulated zones. We are going to make the try-out of growing cotton in all of those areas next year.

Mr. ANDERSON. Then is it going to be necessary to continue this \$200,000?

Doctor MARLATT. New infestation may be determined between now and January. This is the best season for survey work. We are doing very intensive surveying work throughout these States just now, and that work will be continued until the land is plowed up for next year's planting, and there may be findings between now and then. The designation of that sum for reimbursement is of no special significance, because it is spent, as indicated, only where needed. For instance, this year we spent \$42,000 out of the \$200,000; the rest is available to go back into the Treasury if it is not needed for other purposes.

Practically the full amount of the appropriation is needed for continuing work, and if all of this \$200,000 had been spent for reimbursements it would have been necessary to come to you for a deficiency in order to carry out the other work. In other words, that \$200,000 could not be eliminated from this appropriation and allow us to do other necessary work.

Doctor BALL. There was no appropriation; that was simply an authorization to spend that much out of our regular appropriation.

FOR ERADICATION OF THE PARLATORIA DATE SCALE.

Mr. ANDERSON. Your next item is on page 338, eradication of the parlatoria date scale.

Doctor MARLATT. You will find a full statement of the work on the parlatoria date scale in the explanatory statement which I have submitted. Briefly, this work has for its purpose the eradication of the parlatoria date scale.

This scale came in with date palms many years ago, before there was any date industry and before there was any realization of such a possibility and before there was any realization that there was any danger from such an insect—in fact, it came in unknown and unheralded. It is now believed that the success of the date industry in this country is dependent on the eradication of this scale; in other words, if this scale persists and becomes a burden on the industry, it will prevent its growth and establishment. The experts of the Bureau of Plant Industry, who have been especially interested in the matter, believe that this scale can be exterminated. There were some one hundred infested plantations at the beginning and there are 14 now. The work of eradication is being pressed to the fullest extent of our means under the appropriation, and the outlook is very favorable for the extermination of this scale. The department is now supervising and making the importations of new material from abroad; all of this new material must be safeguarded and held in quarantine for a period of years before it is distributed to planters. That is all covered in this work and the continuation of this appropriation for the completion of this work is apparently essential for the future of the date industry—an industry for which the department is peculiarly responsible and in which it is much interested. It has been a department project from the beginning and is very promising.

TUESDAY, NOVEMBER 21, 1922.

DEMONSTRATIONS ON RECLAMATION PROJECTS.

STATEMENT OF DR. WILLIAM A. TAYLOR, CHIEF BUREAU OF PLANT INDUSTRY.

Doctor TAYLOR. Under the head of demonstrations on reclamation projects the agricultural development work on the Government reclamation projects is prosecuted. This constitutes the general agricultural extension work there, comparable with the type of work which within the States is carried on under the Smith-Lever Act. From the beginning this work has been maintained by the Federal

Government because of the relation of the settlers on the projects to the Federal Government as debtors to it for the construction cost of the irrigation works. The appropriation for the carrying on of this \$39,000, and there is no increase estimated for the coming year. The work is under way on some 10 of the projects. On certain of them it is only for a part of the year, those being the newer projects of the Milk River Valley section of Montana, where a good deal of difficulty has been experienced in getting settlers started in irrigation. The work covers to a considerable extent the encouragement of live stock utilization of crops grown on the project. It developed rather early in the occupation of the projects that the production of perishable crops, such as potatoes and fruits, while successful from the standpoint of quantity, was unprofitable because of the long distance from the markets. Settlers were therefore encouraged to swing back to the production of alfalfa and other forage crops and concentrate these into dairy products and other higher-priced commodities, such as beef, mutton, and wool.

Mr. ANDERSON. I have understood that people on these projects are principally men without means and they have had considerable difficulty in procuring money or credit?

Doctor TAYLOR. That is true, to a certain extent, but business men and bankers as a rule have come to a realization of the soundness of live-stock development there and better credit conditions now exist. As the projects become more fully occupied and profitable credit improves, as it becomes possible for settlers to pay their bills. The demonstration work is very useful in this field. It is producing excellent results and the proposal is to continue it on the same basis during the coming year.

FOR EXPERIMENTS AND DEMONSTRATIONS IN LIVE-STOCK PRODUCTION IN THE CANE SUGAR AND COTTON DISTRICTS OF THE UNITED STATES.

Mr. JUMP. On page 317 is the next item, for experiments and demonstrations in live-stock production in the cane sugar and cotton districts of the United States.

GENERAL STATEMENT OF WORK.

Doctor TAYLOR. The paragraph on page 317 for experiments and demonstrations in live-stock production in cane sugar and cotton districts of the United States is a feature of work which has been under way for several years, which had as its objective when inaugurated, the encouragement of live-stock production especially in the cane-sugar territory in the State of Louisiana. The cane-sugar district is essentially a one-crop district. If climatic conditions are adverse to cane the farmers are left in bad shape. If sugar prices are low the cane growers suffer. The most promising method of diversification there to get the region off of the single crop basis has appeared to be through live stock. The problem is a difficult one from the live stock standpoint, for two reasons: One, the wetness of the larger portion of the acreage available, which lies low and the other is the prevalence of live stock diseases and live stock damaging insects. It is a territory where live-stock development has not occurred except

to a restricted extent in the form of semiwild cattle, which range on the cane brakes and paille finne or maiden cane pastures of the lowlands along the southern Louisiana coast. It is a line of work which the department and Louisiana Experiment Station have prosecuted in cooperation, and the department has considered it a worth while work looking toward the future relief of the sugar territory from the single-crop handicap which it carries. In its present location the work is expensive per unit of operation and per unit of achievement thus far.

The site of the field station where the work is located was made available to the department by the State of Louisiana, it being a portion of one of their penitentiary farms of which they operate several in the State. The place is well equipped with buildings. It is well stocked with mules and horses, cattle and hogs for the experimental work that is being prosecuted, but it is expensive and in the interest of rigid economy of expenditure the estimates proposed the determination of that work at as early a date as it can be done advantageously.

Mr. ANDERSON. Is it so expensive as to indicate that live-stock production in that section is likely to be, under normal conditions, so expensive as to be unprofitable?

Doctor TAYLOR. I think not, under rather better soil conditions than those which exist on this particular site. There is a great deal of comparatively unutilized land in the region which will afford range for supplemental feed. There is also in the region much land better adapted to forage crop production under tillage than is this particular site. However, there has developed during the past three or four years a strongly marked tendency under the prevailing economic conditions to substitute rice for sugar cane, these wet lands proving more profitable in rice than they have in sugar or in the forage crops. than it is necessary to grow for silage or for hay.

Mr. ANDERSON. Does the Government own the buildings?

Doctor TAYLOR. The Government owns the buildings. The title is in the form of a deed from the penitentiary board of the State which holds the penitentiary farm, to the Government of the United States for use for this purpose.

Mr. ANDERSON. Conditioned upon your use?

Doctor TAYLOR. Conditioned upon that use as far as the lands themselves are concerned. The other property would be disposed of, I take it—

Mr. ANDERSON (interposing). They would not be of much value without the land, would they?

Doctor TAYLOR. Apart from the land; that is true. The above statement applies, I believe, except with regard to a little entrance plot deeded to the Government by the parish in order to give entrance to the experiment farm without having to go through the penitentiary inclosure. This would also revert.

Mr. BUCHANAN. As a matter of fact, these buildings are not of much value to anybody, but they are fine buildings?

Doctor TAYLOR. For the purpose for which they were planned. They would not be of much value except for that purpose.

Mr. BUCHANAN. And that purpose is a failure?

Doctor TAYLOR. I would not be willing to acknowledge that Mr. Buchanan.

Mr. BUCHANAN. I am.

Doctor TAYLOR. The proposal of the estimate is to terminate this work, providing \$5,000 available after the 1st of July in order to make certain that there could be a thorough closing up of the work, without waste.

Mr. ANDERSON. Is there any prospect that you will be able to dispose of it satisfactorily?

Doctor TAYLOR. There has been no negotiation at all, pending congressional action.

The live stock, and presumably certain of the implements and equipment, would be available for use at other field stations of the department and the language that is inserted proposes to authorize the transfer of that.

Mr. ANDERSON. I understand the water is pretty close under the soil there?

Doctor TAYLOR. The primary difficulty is the very obstinate retention of water through the wet times and the tough and quick baking of the soil in dry times.

Mr. BUCHANAN. Does salt water get up there enough to bother it?

Doctor TAYLOR. It lies sufficiently above and sufficiently far from salt water so that there is no trouble of that character.

Mr. BUCHANAN. You have no drainage?

Doctor TAYLOR. There is drainage enough for an ordinary quality of agricultural soil, but this is a very tough, tenacious, and stubborn soil to handle except when the season turns just right.

Mr. BUCHANAN. Is it black land?

Doctor TAYLOR. Yes, but not black waxy. It is very different, difficult soil, except the areas along the bayou frontage, which are very productive, whether in crops or in pasturage.

Mr. ANDERSON. How much land is there in that tract?

Doctor TAYLOR. In this tract approximately 500 acres, with 500 acres of the penitentiary farm adjacent used for a rough pasture under a lease contract.

TUESDAY, NOVEMBER 21, 1922.

EXPERIMENTS IN DAIRYING AND LIVE-STOCK PRODUCTION IN SEMI-ARID AND IRRIGATED DISTRICTS OF THE WESTERN UNITED STATES.

STATEMENT OF DOCTOR C. W. LARSON.

Mr. ANDERSON. Experiments in dairying and live-stock production in semiarid and irrigated districts of the western United States.

Doctor LARSON. For the dairy work we have two stations—one at Huntley, Mont., and one at Ardmore, S. Dak., and we are asking for the same as for the past several years. In addition to these dairy farms the Animal Husbandry Division is carrying live-stock work at these two or three other farms in this same general region. I have a statement here of the actual experimental work going on at Huntley and at Ardmore. I can put that in the record, if you want to save that time.

Mr. ANDERSON. All right; put it in.

HUNTLEY FIELD STATION:

The Huntley field station, established in 1909, is located on the Huntley reclamation project, near the town site of Osborn, Mont. It comprises 300 acres of public land, of which 140 acres lie above the irrigation canal. The work of the farm is under the supervision of the office of western irrigation agriculture, the office of dry-land agriculture, the biophysical laboratory, and other offices of the Bureau of Plant Industry, the dairy division and the animal husbandry division of the Bureau of Animal Industry; and the Montana Agricultural Experiment Station is also cooperating in the investigational work with field crops and hogs.

The dairy work at Huntley began in 1916, and consists of investigations of problems encountered in establishing dairying in the irrigated sections, particularly with reference to the effective utilization of the forage and grain crops produced in those regions. A herd of purebred Holsteins established in 1917 now numbers 50 head, and the animals are being used in the dairy cattle breeding experiments. In this connection bulls are loaned from this herd to farmers on the project with the object to determine the transmitting ability for production of these bulls. At the present time 34 farmers on the Huntley project, owning over 200 cows, are using bulls from this herd.

The following are some of the experiments conducted at this station:

(1) The maximum carrying capacity of an irrigated pasture for dairy cows. To determine the number of dairy cows that can be maintained on an acre of irrigated pasture. Four plats of one-quarter each were seeded with a mixture of smooth brome grass, orchard grass, tall fescue, perennial rye grass, Kentucky blue grass, white clover, and alsike clover. The four plats are fenced into two half-acre lots which are pastured alternately.

(2) A comparison of the carrying capacity of three mixtures of pasture grasses under irrigation for dairy cows, the following mixtures being used:

| | Rate per acre of seeding, pounds. | | |
|--------------------------|-----------------------------------|----------------|----------------|
| | Mixture No. 1. | Mixture No. 2. | Mixture No. 3. |
| Awnless brome grass..... | 2 | 2 | ..... |
| Orchard grass..... | 5 | 5 | ..... |
| Tall fescue..... | 3 | 3 | ..... |
| Perennial rye grass..... | 3 | 3 | ..... |
| Kentucky blue grass..... | 4 | 4 | ..... |
| White clover..... | 2 | ..... | ..... |
| Alsike clover..... | 2 | ..... | ..... |
| Seed per acre..... | 21 | 17 | 16 |

One-half of these plats are being top dressed with manure each year and compared with those without top dressing.

(3) The feeding of dairy cows on roughage alone as compared with roughage with liberal grain feeding, and with limited grain feeding to determine the economy of production of these two methods of feeding.

ARDMORE FIELD STATION.

The Ardmore field station was established by the Bureau of Plant Industry in 1911 and dairy operations began in 1916. The work on the farm is under the supervision of the office of dry-land agriculture, the dairy division, and the animal husbandry division of the Bureau of Animal Industry. There are 1,200 acres in the farm, of which 353 are used by the dairy division for corrals, permanent pastures, and crop land. The dairy work consists of investigations of problems encountered in establishing dairying in dry-land sections, particularly with reference to the effective utilization of forage and grain crops produced.

The herd of pure-bred Holsteins established in 1917 now numbers 41 head, and they are being used in the dairy cattle breeding experiments.

The following are some of the experiments in progress:

(1) Pasture experiments: (a) Native pasture composed of buffalo grass, grama, and wheat grasses; (b) sweet clover; (c) brome grass; (d) slender wheat grass.

(2) The feeding of home-grown rations as compared with home-grown roughages supplemented by purchased concentrates in the economy of milk and butterfat production.

(3) The determining of what returns may be made through the dairy for home-grown feeds.

(4) Determining the cost of feeding calves and dairy cows under local feeding conditions.

Mr. ANDERSON. Well, these stations cover both the dry land and irrigated propositions do they?

Doctor LARSON. Yes, sir.

Mr. ANDERSON. Both of them have relation to dairying and animal husbandry, do they not?

Doctor LARSON. Yes, sir. There is no change in this item.

Mr. ANDERSON. Is this work done in collaboration with the Bureau of Plant Industry?

Doctor LARSON. Oh, yes, sir. They grow the crops and the farms were originally established by that bureau.

FIELD STATION AT WOODWARD, OKLA.

Mr. ANDERSON. On page 321, you propose to abandon the field station at Woodward, Okla.?

Doctor LARSON. Yes, sir.

Mr. ANDERSON. Will you tell us why?

Doctor LARSON. In view of the necessity for rigid economy of expenditure the discontinuance of the livestock work at Woodward, Okla., is contemplated, except to the extent that it can be done in connection with the adjacent dry-farming field station maintained by the Bureau of Plant Industry under its subappropriation for investigation and improvement of methods of crop production under subhumid, semiarid, or dry-land conditions.

Mr. ANDERSON. Is this station at Woodward?

Doctor LARSON. This station is at Woodward, Okla.

Mr. ANDERSON. Was this proposition originally intended to be a separate station?

Doctor LARSON. This Woodward station?

Mr. ANDERSON. Yes, this live-stock proposition?

Doctor LARSON. Yes, sir.

Mr. ANDERSON. Let me see if I understand this. You have got a plant at this station now. That is, this proposition was to be a live-stock proposition in addition to that?

Doctor LARSON. Yes, sir.

Mr. ANDERSON. Separate from that?

Doctor LARSON. Adjoining it and maintained by the department under the supervision of the man in charge of the dry-land farm.

Mr. ANDERSON. That is exactly what you propose to do anyway, is it not?

Doctor LARSON. No. The idea of the wording of this statement was to provide for the possibility of carrying this on on a smaller scale and perhaps in cooperation with the State.

Mr. ANDERSON. What will you do if this goes out?

Doctor LARSON. We will be obliged to move the herd elsewhere and discharge the herdsman, and the farm will revert to the city of Woodward, Okla.

Mr. ANDERSON. Where is your nearest lives-tock station to Woodward?

Doctor LARSON. The ones at New Iberia or Ardmore would be the nearest, so far as dairy cattle are concerned.

Doctor MOHLER. There are only about fifteen cattle there now, are there not?

Doctor LARSON. Fifteen head. This was a special item put in in 1921.

Mr. ANDERSON. I never was for this farm, but it is there and unless the work which would be done there anyway is done elsewhere there might be some reason for continuing it.

Doctor LARSON. The particular region is different from the other dry-land regions where we are working. They have a particular situation in there, pasturing of their wheat crops and information along that line is important at the present time, to know whether or not it is advantageous to pasture their wheat crop in the winter time—winter wheat—and that is the experiments we have there now.

Mr. ANDERSON. Can it be maintained on its present basis for \$12,500?

Doctor LARSON. Yes, sir; it can be maintained for less if necessary.

Mr. ANDERSON. That was your estimate for last year; \$6,500 is what you expended.

Doctor LARSON. That is what we are running on now. It can be run on that another year.

WEDNESDAY, NOVEMBER 29, 1922.

ENFORCEMENT OF THE PACKERS AND STOCKYARDS ACT.

STATEMENT OF MR. CHESTER MORRILL, ASSISTANT TO THE SECRETARY OF AGRICULTURE AND IN CHARGE OF PACKERS AND STOCKYARDS ADMINISTRATION.

Mr. ANDERSON. We will next take up the item on page 348, for the enforcement of the packers and stockyards act.

Mr. MORRILL. In order to put before the committee an accurate statement and one of which it can make use, I have written out a brief statement which brings the work of the packers and stockyards administration up to date from the point where the first annual report leaves off.

GENERAL STATEMENT.

The annual report has not yet been released for publication, but the Assistant Secretary has authorized me to furnish to each member of the committee a copy of the annual report, which will show from the beginning of the work under the packers and stockyards act the methods of organization, the subject matter covered, the extent of the work that we have to do, and what we had done up to the end of the last fiscal year. The subsequent statement in typewritten form brings it up practically to the present time, and I will furnish a copy of it to each member of the committee.

Now, at the present time we have 79 public stockyard markets in 71 cities in the United States that are subject to the jurisdiction of

the Secretary of Agriculture by reason of having been found such upon investigation and having been posted as such markets. In those markets we have found by the registration approximately 3,500 dealers and 1,000 market agencies. Most of the market agencies are commission men, and the market agencies, including the commission men, are subject to requirements that do not apply to the dealers' business. The market agencies are a class of agencies that do business principally on the commission basis, and they are required to file with the Secretary of Agriculture their schedules of rates, charges, and such rules and regulations as they observe in carrying on their business.

In a broad way, it may be said that they are subject to the same sort of jurisdiction as the railroads are subject to under the interstate commerce act with respect to their practices. That is to say, with respect to their practices, they must be nondiscriminatory and reasonable, and with respect to their rates, they must also be nondiscriminatory and reasonable. The Department of Agriculture does not make the rates in the beginning. They file the rates and publish them, and they are subject to investigation, explanation, and modification, as the facts may require. The same thing is true of the stockyard companies as well as of the market agencies. In order to deal with the physical aspects of the marketing of live stock, as we found them at the stockyards, we have supervisors at 20 of the cities where there are stockyards. Those supervisors are resident in those markets, but from time to time, by assignment or special instructions, they go to other yards for the purpose of dealing either with special questions that may arise, or for the purpose of remaining in the markets for a longer time in order to become thoroughly acquainted with the conditions and to see that the various agencies subject to our jurisdiction thoroughly understand what we are expecting of them under the packers and stockyards act. We have so thoroughly organized the supervisor force that during the month of October all except seven or eight of the public stockyard markets of the country were visited by supervisors. In addition to the stockyard companies and market agents and dealers operating at the stockyards, we have, of course, the packers, who operate both within and without the yards.

So far as their operations in the yards are concerned, they are dealt with in the same way as other operations in the yards are dealt with. Then we have certain other operations that must be dealt with specially, such, for example, as you will note from reading the annual report and that supplemental report. For instance, there is the question of discrimination in butter fat prices, which arose during this year, several complaints having been made against one or two large packers upon the ground that in their buying operations at country points they had discriminated between country points and had also been guilty of unfair competition. Such matters as that require special investigation. So far we have found the complaints to be unfounded. In one particular case that I have in mind the man that made the complaint was found to be the man who started all the trouble. He started a rate cutting war and did some improper advertising, and the packers simply met the competition. Other aspects of the packer work, other than those special matters, come up from time to time, more particularly the matter of studying their

accounting systems and arriving at an ability to determine what are the true costs in the packing industry. In that we have been delayed for several reasons:

First, because during the first year of our operations, we found that we were in competition with almost everybody else to get auditors, and it was virtually impossible for us to get more than just a few auditors to deal with the pressing questions in connection with commission rates and similar matters. It has only been during the last two or three months that we have been able to go into the field of accounting to the extent of getting enough auditors to organize a force that would look forward to a study of the accounting systems. It seems that during the past few months there has been a sort of let-up in the demand for accountants, partly due to the summer season and partly due to the commercial depression, and through the medium of civil-service examinations we have been able to get hold of a number of men who seemed to be very competent, so that the work of studying the packers' accounting systems is now started. We have been under a good deal of pressure in the last few months, and are right now, on account of complaints having been filed as to commission rates. We have taken those complaints and have been working up the information, but at the present time we have the question of reasonable commission rates to determine at Chicago, St. Paul, Omaha, Kansas City, Fort Worth, Denver, and Portland. We have also the question of certain stockyard charges to determine at Peoria, Ill., Omaha, Nebr., Chicago, and Milwaukee, and in a number of yards the companies have taken up with us informally the matter of certain changes in their rates, knowing that if they were to present the proposed changes formally they might run up against suspensions.

During the early part of the administration of the act there were a number of reductions in stockyard rates particularly, but recently, on account of the very great advance in corn, there has been an attempt, which looks almost like a concerted movement, to raise the rates on corn in the stockyards generally. Chicago, Milwaukee, and Buffalo have proposed an increase of 15 cents per bushel. We have suspended the Chicago and Milwaukee increases, and they are awaiting a hearing now. At Buffalo there is a slightly different condition of affairs, because of the fact that when they increased their corn rate, they reduced their hay rate, and it may be that they have an equity that is different from that of the other yards. In addition, a number of the yards have introduced a new charge this year that had not previously been made, called a "reweighing charge." That is a charge which is imposed upon speculators operating in the speculator division for the service of weighing their animals.

That is sometimes known as a reweighing charge and it is sometimes known as a second weighing charge. That is to say, the speculators buy the bulk of their animals from commission men, and in the past the stockyards have been supported almost exclusively from yardage charges and feeding charges imposed upon the first handling through commission men, plus a feeding charge to the speculators, but without any yardage charge to the speculators at all. The stockyard companies have conceived the idea that that is a discrimination, and it also means a possible increase in their revenues. The question that we are trying to work out now is how to deal with the reweighing

charge so as to do equity among all the people involved. Not all of the stockyard companies have made the charge. Some of them take the view that the speculators' division is something to be maintained in the markets, and that they are justified in not imposing the same charges upon speculators that they do upon others. Those who are proposing to increase the rate take the other view—that is, that the support of the yard should come from all alike, regardless of whether they are necessary to maintain the market or not. All of that work in connection with commission rates has simply taken all of the time of the auditors that we could get together, plus a good many temporary people to get up the necessary statistical information on market conditions. It will be some time before we can dispose of all of those cases.

COMMISSION MEN AND PRODUCERS' ORGANIZATIONS.

Fortunately, in one respect we have brought about a condition of affairs comparatively recently where for the first time, so far as we know, the commission men and the producers' organizations have been willing to get together in the same room and talk over the commission rates. They are doing it because we are placing our representatives in the conferences for the purpose of participating in them. Formal complaints were filed, as a matter of fact, by the Western Producers' Association at six of those markets. When those formal complaints were filed, we took up the matter with all of the organizations concerned for the purpose of getting them together on a method of procedure which would eliminate the technical requirements of what would be almost a court hearing in the presentation of the evidence, as well as the employment of lawyers and things of that kind, and within the last two or three days we have received advices from all the markets except one, saying that they will join in this informal method of having two of our representatives, the head of our rate division and the head of our trade practices division, act virtually in the capacity of arbitrators. The idea we have is to deal with the subject from the purely practical standpoint and to have the procedure stripped of all technicalities and of all the legal requirements that lawyers might impose, for the purpose of getting down to what will be a commission rate that will be acceptable to everybody concerned, as a purely practical matter. We think that that will go a long ways toward getting rid of the commission rate question in the future when it is worked out, because one of the conditions of the stipulation that the parties are agreeing to is that the commission men will accept whatever conclusion is reached as a result of that conference, and that they will put it into effect without appeal to the courts.

TRAINING OF PERSONNEL.

In building up the kind of organization that we have in the yards, of course we have had to build almost from the bottom, taking men who knew nothing about the packers and stockyards act, but who were acquainted with practical marketing conditions in the yards. We have had to train them up, and, in order to bring about solidarity and uniformity in the organization we have a system by which every

supervisor reports once a week on everything that he has done, on every question that has come up in his experience, and either the disposition he has made of it or the disposition that he wants to make of it. The reports of those activities have been summarized and furnished to all of the other supervisors once a week, so as to keep them in line with every thing that is going on. During the last two months we have summarized and used the reports in the Department that could be given out to the public without a breach of confidence, or without starting any trouble with any particular yard. The statements in the monthly summary, of which I have the last one here, are framed in such a form as to describe just exactly what we are doing at the yards during the month. I have brought copies of the monthly summary, because from that you can better visualize what we are trying to do.

Mr. ANDERSON. When a question arises as to rates, would the parties have to come to Washington for a hearing, if the ordinary procedure were followed?

Mr. MORRILL. No, sir; we hold the hearing in all cases in the market where the question arises. We do not hold hearings in Washington at all. I do not see where that would do anybody any good.

Mr. ANDERSON. I do not either, and that is the reason I asked the question.

Mr. MORRILL. In other words, we want to get the facts, and the place at which to get the facts is in the market where the question arises. You can hold a hearing at the market, and bring in everybody you need and hear what he has to say, and then send him back to his work, just as you do here in your hearings. He can remain if he wants to, but he can go about his business as soon as he has said what he wants to say. The Government bears the expense of its own travel, and the market agencies are relieved of that expense. They get their hearings right on the ground where they have the evidence and the witnesses. If the hearings develop that they need something else, they can go out and get it. For example, we held a hearing in one market recently, and the man who made the complaint presented a case which seemed very meritorious. It was a thing that involved a question that was fundamental in the making of rates in stockyards, but, as a matter of fact, for various reasons the people who had a like interest decided that maybe it was not the best thing for all concerned. They had reasons for thinking that it was not good business. When our people arrived at the yard and found that condition, they simply went out and got the people who knew the facts and brought them in and had them make their statements so that we would be able to decide the case on its merits. We resort to just as little formality as possible to get along with and keep the record clear for legal purposes.

Mr. ANDERSON. I think that is a very sound practice.

COMMISSION RATES.

Mr. MORRILL. The amount of the appropriation provided for by this estimate is precisely the same as we have for this year. There is no change in it. If you do not mind my taking your time, I might mention one thing that we are doing, or have done, in connection with those commission rates that is of a good deal of interest to us and is going to be of a good deal of interest to the commission men.

Before we knew that those complaints would be filed, we started in to analyze the commission men's operations in five typical markets for the purpose of determining just how they got their revenues and for what purposes they expended their money, having in mind the object of comparing those different markets and utilizing the information in arriving at sound principles to cover our future rate determinations. What we would like to do would be to have some fundamental facts that will shorten the rate work later on. For that purpose we selected Pittsburgh, St. Paul, Omaha, Fort Worth, and Portland. All of them except Pittsburgh were subsequently brought into the complaints, so that the time was well employed when those markets were selected.

Now, by taking the conditions at those markets an interesting comparison can be made. We will take Pittsburgh, Fort Worth, and Portland; and, roughly speaking, they are in one group, while St. Paul and Omaha are in another group. At Pittsburgh there are 10 commission agencies, at Fort Worth 13, and at Portland 8, of which 6 were in continuous operation during 1921. At St. Paul there are 31 commission agencies and at Omaha 54. In looking over their figures we find that at Pittsburgh their average net return to the owners is 60 per cent of the income, at Fort Worth 9 per cent, at Portland 37 per cent, at St. Paul 27 per cent, and at Omaha 38 per cent. Omaha and Portland operate on practically the same percentage. We took the average net return to the owners without regard to the percentages, and we have an average net return in Pittsburgh of \$23,000, as against only \$16,000 in Omaha and \$4,000 in Fort Worth. Now, as a matter of fact, in examining the expense we find that Pittsburgh, for example, accomplished those net earnings largely by not spending so much money as the others or not spending so much money in advertising, solicitation, or anything else hardly. Practically all of the items of expense were greatly below those of any other market. Now, of course, all of those things are affected by the volume of business, and we have not completed our statistical information on the volume of business. That is being worked up now, so as to apply those figures to the volume of business. An interesting thing about that is the way they distribute their income when they get it. Among other things, in the course of this comparison, we will be able to show just how the cooperative enterprises working in the same markets get along as to expense, and as to cost per car, per head, or per pound, as compared with the old line agencies. In other words, we will probably get something that is fact rather than conjecture on those points.

Mr. ANDERSON. Of course, to really furnish much of a basis for comparison, I assume that those figures would have to be divided into volume of business in some way, so as to get at the cost per car, per head, or per pound.

Mr. MORRILL. Yes, sir; and we are taking all three of those things. We are going to work it out per car, per head, and per pound, and then we are dividing it by species, of course. Then, we are taking into consideration just how much money they spend for each class of expense, solicitation, advertising, etc. Some of them spend a great deal more for advertising than others. For instance, in some markets a great deal of money is spent for market papers. The secretary of one exchange told me last winter that many shippers

get seven or eight copies of the same market paper from commission men. Of course, things of that sort ought to be eliminated.

Mr. ANDERSON. It is not the commission men alone who are doing that sort of thing.

Mr. MORRILL. Of course, we happen to be dealing with that particular problem. I do not contend that that is the only place where we will find it.

Mr. ANDERSON. Will you use the entire appropriation this year?

Mr. MORRILL. Yes, sir; it will be used this year. We did not use the entire amount last year. We used \$174,000 out of the \$200,000 provided, but this year, on account of all of these things coming up at once, and the necessity of employing a great many temporary people, we will use the whole amount.

PROCEEDINGS TOUCHING THE PRACTICES OF PACKERS.

Mr. ANDERSON. Have there been any proceedings begun touching the practices of packers?

Mr. MORRILL. No, sir; there have been no formal proceedings except one. There was a proceeding instituted by the Kansas City Livestock Exchange against Armour & Co. and the Fowler Packing Co., of Kansas City, on account of the fact that Armour & Co. operated a yard known as the Mistletoe yard at Kansas City, not far from the public yard, where they bought live stock that had been shipped direct to the Fowler Packing Co. at the Mistletoe yard, and not passing through the open yard. The operations in the Mistletoe yard were limited exclusively to hogs, and to persons or shippers out in the country who were in a position to supply the kind and quantity of hogs that the Fowler Packing Co. needed for its operations. The Fowler Packing Co. is largely an export slaughtering plant. In that case, it was complained that the maintenance of those yards operated as a depressing influence upon the public stockyard, and, also, that the yard was, in fact, a public stockyard market and that it ought to be brought under Title 3 of the packers and stockyards act.

We held quite lengthy hearings on that matter at Kansas City. Twelve days were consumed in the presentation of the evidence on both sides. We found that there was no possibility of the two sides getting together informally, because there was a question of principle involved, and it was looked upon with a great deal of concern all over the country as involving the question of whether packers might buy direct from the country instead of through the public yards. We found, in the first place, that the Mistletoe yards were not, in fact, public stockyards, but simply receiving yards for shipments sent in from the country yards, where the grading, docking, or pricing took place for the purpose of closing the transactions. The prices at the Mistletoe yard were based upon the prices of the same day in the public stockyards market of Kansas City. One of the complaints was that because of the fact that the Fowler Packing Co. was owned exclusively by Armour & Co., and, therefore, was merely a department of Armour & Co., the receipt of those hogs in the Mistletoe yard took that amount of hogs out of the public yard and gave the buyers of Armour & Co. a certain power that they should not possess in the public yards. There was not any evidence brought forth to substantiate that. We were unable to find facts in the evidence to

substantiate the contention that the operations of Armour & Co., by reason of the operations of the Mistletoe yard, depressed the market.

On the other hand, there was a pretty good argument, if you want to theorize on it, that taking that many hogs out of the public yards might possibly be beneficial to the yards. As a matter of fact, a comparison between the prices at Kansas City and those at other markets showed that during a considerable part of the time Kansas City was the higher market. We did find certain improper practices in connection with the Mistletoe yard. We found, for example, that the Fowler Packing Co. was encouraging noncompetition between different shippers by a system of what was called protecting the shipper. In other words, if one shipper tried to get into another shipper's territory, he would probably lose his right to ship to the Mistletoe yard. We also found that there was discrimination between shippers with respect to the feeding of hogs in the Mistletoe yard. Some of the shippers got their hogs fed, although the Fowler Packing Co.'s announced policy was not to feed any hogs upon arrival. We ordered those things stopped, and the order has been complied with in every respect.

There have been no other formal proceedings against the packers, and the other matters that have come up have been informal. For instance, there has been the matter of the butter-fat discrimination, and also the matter of the amount of butter placed in butter cartons. There was a complaint that a big packer was putting 15 ounces of butter in an ordinary pound carton and simply stamping 15 ounces over the pound on the label. There was no difference in the size of the carton. We got together all of the big packers and representatives of the American Creamery Butter Manufacturers and others on the question of whether that was a desirable business practice. They agreed that it was not and they stopped it immediately.

Mr. ANDERSON. Was there any difference in the price of this 15-ounce package and the pound package?

Mr. MORRILL. There was not, so far as we could find. By that I mean that while probably the packer sold it at a price slightly less, so far as we could ascertain, the retailers might or might not have sold it for less. The ground of complaint seemed to be that other people who were trying to sell straight pound packages were not able to make a go of it, and were complaining that it was unfair competition for somebody else to sell 15-ounce packages. Not only did they agree that that particular practice should be stopped, but they agreed upon the principle of the standard size carton—in other words, that there should be no deviation from the quarter-pound, half-pound, and pound sizes. Recently I made some inquiry regarding it and I am unable to find that the agreement has been departed from anywhere, although, from our understanding, there were several million pounds sold previously in that manner. As I have said, we are attempting to work on the matter of the accounting systems now.

ENFORCEMENT OF THE GRAIN FUTURES ACT.

Mr. ANDERSON. The next item is for the enforcement of the grain futures act.

Mr. MORRILL. The grain futures act, as you have it before you, takes the place of the future trading act of August 24, 1921, the

operation of which was virtually suspended before its effective date. In May, 1921, the Supreme Court held that that act, which was passed under the taxing powers of Congress, was unconstitutional as to its regulatory provisions, leaving in effect the tax on puts and calls and leaving in effect the section authorizing the Secretary of Agriculture to carry on investigational work, without power, however, to compel members of exchanges to disclose their books or to make reports. Immediately after that a new bill was introduced in Congress under the interstate commerce power, based upon the theory that those transactions on the Chicago and other boards of trade are so closely interlocked with interstate commerce that they are inseparable from it in effect and that anything which operates adversely upon the price on a futures exchange—and by “adverse” I do not mean necessarily downward, but either downward or upward, contrary to the normal operations of the law of supply and demand—would necessarily operate adversely upon the cash grain business of the country. Upon that theory the bill was reintroduced and was passed the bill containing, as to its substantial provisions, virtually a repetition of the provisions in the act that was declared to be unconstitutional.

Mr. ANDERSON. Did the second act repeal the taxing provision of the first act?

Mr. MORRILL. No, sir.

Mr. ANDERSON. That is still in force?

Mr. MORRILL. Yes, sir. That section of the first act was not affected by the decision of the Supreme Court. That has been virtually self-operating, because the exchanges have stopped that practice so far as we know. If they are doing anything of that kind now, it is under cover.

Mr. ANDERSON. I judge they have, because they are making such an awful holler about it.

CONSTITUTIONALITY OF NEW LAW BEFORE COURTS.

Mr. MORRILL. By reason of the similarity of the provisions of the two laws, outside of the legal question, the same exchanges are subject to the new law that were subject to the old one. There are 11 of them—2 at Chicago, and 1 each at Milwaukee, Duluth, Minneapolis, Kansas City, St. Louis, Toledo, Baltimore, Los Angeles, and San Francisco. Not all of them deal in all kinds of grain, and some are more limited than others. The Chicago, Milwaukee, Duluth, Minneapolis, Kansas City, and St. Louis exchanges brought suits to test the constitutionality of the new law, but all of them have been suspended in the lower courts now, remaining in their original status as a temporary stay against the Government, except the Chicago suit, where, when the question of granting a temporary restraining order came up before the district court a few weeks ago, the court on its own motion dismissed the bill of complaint of the Chicago Board of Trade, denied the injunction, and granted an appeal to the Supreme Court of the United States, and on Monday of this week a motion was presented to the Supreme Court to advance the hearing of that case. The Government, of course, is very anxious to cooperate in getting it decided promptly. The other cases will await the disposition of the Chicago Board of Trade case.

Mr. ANDERSON. Do I understand you to say that this act, so far as the exchanges you have enumerated, with the exception of Chicago, are concerned, is inoperative now?

Mr. MORRILL. It is inoperative just now. We filed an answer in the Chicago Board of Trade case which presented our viewpoint, for the reason that we were in doubt whether the Government could afford to admit any of the allegations in the bill of complaint filed by the Chicago Board of Trade, and because the Chicago Board of Trade attempts in its bill of complaint to negative the allegations in the act itself as to the nature of the business, thus raising an issue of fact; but apparently the court at Chicago took the view that it might be possible for the Supreme Court of the United States to take sufficient judicial notice of the facts to pass upon the bill of complaint without a hearing. As a matter of fact, a hearing in the lower court, involving the taking of evidence at every turn, would be a quite expensive and quite long drawn out matter. We have continuously during the past year kept a man at Chicago and Minneapolis, in anticipation either of litigation or of enforcement of the law, getting together all the information that he could get as to the operation of both of those boards of trade, using the records of the Bureau of Internal Revenue to a considerable extent, and thus getting acquainted with the various commission men and other traders on the exchanges, their lines of business, their sources of business, the methods that they employ in doing business, etc.

Mr. ANDERSON. To what extent has the prohibition of puts and calls reduced the number of transactions or narrowed the market?

Mr. MORRILL. We have no record of the number of puts and calls, but that does not affect the transactions in the pit at all. The put and call transactions were outside of the pit. I do not see that the elimination of puts and calls has in any way narrowed the market, nor that it has in any way operated to the disadvantage of the market.

Mr. ANDERSON. I have recently had a number of men to complain very bitterly because of the alleged effect of this act on the market. But I do not see how that could possibly happen.

EFFECT OF ACT ON THE MARKET.

Mr. MORRILL. I have some concrete facts on that subject that I think will answer your question. Or men have been at work getting facts, and I think something can be said about that. Taking the Chicago Board of Trade, the total number of bushels of wheat futures sold during the eight-month period in 1922—that is, during the first eight months ending with August—were 8,086,122,000, as compared with 7,784,822,000 bushels for the same period in 1921. That is an increase of approximately 300,000,000 bushels during those eight months.

Now, as a matter of fact, our figures up to date indicate that in all futures—that is, including corn, oats, and other grains—there has been some decrease in the volume of trading up to date this year as compared with last year, although the first eight months did not show any decrease in wheat, but, on the contrary, showed an increase. We think, however, that that is not due to the law. We think also that there are a good many things being said about the law by persons

who have, perhaps, not read the law at all, and who do not know what it provides. As a matter of fact, what this law does is to say to those exchanges, "You must operate under the supervision of the Federal Government, and you must see to it that the prices on the market are not manipulated or controlled, that there are no attempts to corner the market, that there shall be no dissemination of false and misleading information about the crop and market conditions, that you keep adequate records showing all the facts of transactions, and that you shall make such reports as the Government may require from time to time showing how the business is going on, plus a requirement that you must not discriminate against cooperative associations of producers solely upon the ground that they are paying patronage dividends.

I think that is a fair statement of what the law requires, and I do not know of any reason why anyone should look upon that as an extreme exercise of governmental power, or as giving power to do anything that ought not to be done. The grain futures act is a means by which the Government will be enabled to say what are the facts as to the amount of business, and how it is conducted on the exchanges, and will be able, if necessary, to formulate a basis upon which to prepare legislation that will get at the real needs. In other words, it puts the Government in a position to get the facts.

Last year the case that was brought before the Supreme Court was taken up in December and decided in May, and this year it is up in November, and I see no reason why the Supreme Court should not decide it as soon or sooner than it did last year, particularly because of the fact that last year it was apparent that the decision was delayed by reason of the child labor decision.

MR. ANDERSON. That would mean, then, that if the decision was favorable to the Government's contention, the enforcement of the act would begin about the time the appropriation for the fiscal year covered by this estimate would be available?

APPROPRIATION FOR 1924.

MR. MORRILL. Yes, sir; it should be in full swing by that time. The estimates presented to you now are precisely the same as those for this year.

MR. ANDERSON. And your plans will be the same?

MR. MORRILL. The same plans will also apply. I see no reason to alter the plans, because there has been no alteration of the conditions that would require a change of the plans. We are expending approximately \$30,000 this year on investigational work and in getting up all sorts of information that will be of use, both in connection with the litigation in the Supreme Court and in connection with giving the work active supervision when that time comes.

MR. MAGEE. Do you expect to spend the appropriation of \$103,600 for this fiscal year?

MR. MORRILL. I drew up the estimates, at the time they were drawn up, upon the basis that the same estimates would be required from the standpoint of giving supervision to the principal markets and getting up the information that will be necessary from the investigational standpoint to support the conclusions that the Secretary of Agriculture might draw from the economic standpoint.

MR. MAGEE. That does not answer my question.

Mr. ANDERSON. I understood you to say that of the appropriation for this year you expected to spend about \$30,000.

Mr. MORRILL. I thought you were speaking about the estimates for this year.

Mr. MAGEE. No; I am talking about the appropriation for 1923.

Mr. MORRILL. We expect to spend approximately \$30,000 of that appropriation.

Mr. MAGEE. But, assuming that you should not get a decision by the Supreme Court right away on that question, how much would you spend?

Mr. MORRILL. Of course that would delay putting in the organization that the estimates contemplate. We would not put in the organization that the estimates contemplate unless the Supreme Court should hold the law to be constitutional.

Mr. MAGEE. You could hardly justify the appropriation of any amount of money until the court rendered its decision, could you?

Mr. MORRILL. Only in the way we are doing it now, by putting ourselves in a position to hold our own in the litigation and in laying the basis for the supervision that may take place next year.

Mr. MAGEE. Suppose the court should render its decision before the end of this fiscal year, would you need this \$103,600 to take care of the act for 1924?

Mr. MORRILL. Yes, sir.

Mr. MAGEE. Suppose you should not get a decision?

Mr. MORRILL. If we should not get a decision, it would be lessened by the length of time that the decision was delayed.

Mr. MAGEE. If the decision were adverse, you would not need the money at all?

Mr. MORRILL. No, sir. In that case we would not spend the money at all, because if the decision should be adverse, I am inclined to think that it would wipe out the whole law. That was not the case in the decision on the other law.

WEDNESDAY, NOVEMBER 29, 1922.

COLLECTION OF SEED-GRAIN LOANS.

STATEMENT OF MR. LEON M. ESTABROOK, CHAIRMAN SEED LOAN COMMITTEE, UNITED STATES DEPARTMENT OF AGRICULTURE.

GENERAL STATEMENT.

Mr. ESTABROOK. Mr. Chairman, continued drought in the Northwest over a series of years caused such financial distress, especially to the farmers who were unable to make crops, and who found it necessary to mortgage all of their assets, that in the spring of 1921 many of them were without seed or money or credit with which to buy seed. Congress made an appropriation of \$2,000,000 in the spring of 1921, and a further appropriation of \$1,500,000 in the spring of 1922, to meet that situation. Of the \$2,000,000 available in 1921 there were loaned about \$1,945,708 to 13,935 farmers in the States of Idaho, Montana, North Dakota, and Washington. In the spring of 1922, from the \$1,500,000 appropriated for seed-grain loans, there

was loaned about \$1,481,787 to 11,968 individual farmers in Idaho, Montana, North Dakota, South Dakota, and Washington.

Mr. ANDERSON. What was the maximum loan allowed under that law?

Mr. ESTABROOK. \$300.

Mr. ANDERSON. In both cases?

Mr. ESTABROOK. Yes, sir. Most of the loans were for considerably less than that. The applications were scaled down to make the money go as far as it would. In the autumn of 1921 an attempt was made to collect the loans that were made that spring, and again in the autumn of 1922 we have carried on a most energetic campaign to collect as many of those loans as possible. Up to November 4, 1922, we had collected of the 1921 loans \$822,007, or 42.3 per cent of the amount loaned in 1921. Up to the same date, namely, November 4, 1922, we had collected of the amount loaned in the spring of 1922, \$450,662, or 30.4 per cent of the amount loaned in the spring of 1922. If those figures are totaled it will be found that in 1921 and 1922 we made 25,903 individual loans, amounting to \$3,427,494, of which there has been collected to November 4, 1922, \$1,272,666, or 31.1 per cent of the total. That leaves outstanding and unpaid and yet to be collected \$1,123,703 of the 1921 loans, and \$1,031,125, of the 1922 loans, or a total of \$2,154,827 for the two years, or 62.9 per cent of the total amount loaned yet to be collected.

I have here a statement showing the number of loans and the amount collected in 1921 by States and counties, and a further statement showing the amounts loaned and the collections to November 4, 1922, by States and counties for both years, with a summary of all.

Of the \$2,000,000 appropriated for seed-grain loans in 1921, \$1,940,002.20 was loaned to farmers, according to this statement, and \$52,464.98 was used for administration expenses in making and collecting the loans, leaving an unexpended balance of \$7,532.82 to go back into the Treasury. Of the \$20,000 available for administration expenses of the seed-grain loan appropriation for 1922, \$19,509.48 was actually expended; \$2.61 remains as a liability, making the total expense \$19,512.09, with an unexpended balance which will be returned to the Treasury of \$487.91.

INTEREST ON LOANS.

Mr. ANDERSON. Do these loans carry any interest?

Mr. ESTABROOK. They carry interest at the rate of 5 per cent.

Mr. ANDERSON. Have there been any instances in which interest has been paid?

Mr. ESTABROOK. There are a good many instances in which interest has been paid. A complete record of that is kept in the seed-grain loan office at Grand Forks, N. Dak., but the statement from that office to which I referred does not show the interest collected.

Mr. ANDERSON. What chance is there of collecting the remainder of this money, or some portion of it?

Mr. ESTABROOK. The collections are coming in at the rate of \$15,000 per day. At the present time they are running around seventy or eighty thousand dollars per week. It varies from week to week. We had expected much larger returns because of the good crops. The North Dakota crops this year were 27 per cent better

than they had been for a series of years, and the crops in Montana were better than they have been for many years. There are various reasons why the collections are coming in slowly. One, of course, is the competition of other creditors. The eastern capitalists who have loaned money out there and the banks, implement companies, and local merchants that are creditors of these farmers feel that this is the only good crop year they have had for some time, and that now is the best time they will have to collect on their debts. Of course, the borrowers have their difficulties. Their crop of wheat is selling at relatively low prices, or around 80 or 85 cents per bushel. They went in heavily on potatoes, particularly in North Dakota, last spring, and we have bumper crops of potatoes throughout the United States. There is very little market for their potatoes. The warehouses are full, and there is a car shortage. They can not get cars or storage for them, and buyers are not on the ground. They are not interested in those potatoes, and they will not bring 20 cents a bushel. Lots of them will never be sold. Therefore, it is hard for many of those farmers to raise cash, and unquestionably the longer we postpone the collection the more difficult it will be to collect.

Mr. ANDERSON. If I remember correctly, those loans were made upon seed-grain mortgages.

Mr. ESTABROOK. They were covered by seed-grain mortgages.

Mr. ANDERSON. In every case?

Mr. ESTABROOK. Yes, sir.

Mr. ANDERSON. In that event, it would seem that where a man made a crop sufficient to pay the loan, the money could be collected.

Mr. ESTABROOK. We can enforce those 1922 mortgages, because we have the 1922 crop to fall back on, and we are pressing those very vigorously. It will be much more difficult to collect the unpaid 1921 loans.

Mr. ANDERSON. Of course, there the security is gone.

Mr. ESTABROOK. Yes, sir. We tried to get as many renewal mortgages on the 1922 crops covering the 1921 loans as we could, but many of the 1921 borrowers did not respond, failed to arrange for the extension of their 1921 loans with a mortgage on their 1922 crop.

Mr. BUCHANAN. How much of the money loaned in 1921 have you collected in 1922?

Mr. ESTABROOK. I can not give you the exact figures. We have the seed-grain loan office at Grand Forks to telegraph each Monday morning their collections for the week, and they follow that up with a written statement. The weekly collections for the week ending October 14 ran \$31,316 for 1921 seed-grain loans, as compared with \$61,000 on 1922 loans, or about half as much for 1921 as for 1922. For the week ending October 28 there were collected practically \$27,000 on 1921 loans, and \$71,000, or more than twice as much, on the 1922 loans. For the next week the collections were \$37,000 on 1921 loans and \$71,000 on 1922 loans. It is running at about that rate, or about twice as much is being collected on the 1922 loans as on the 1921 loans. Wherever we can, we are applying any remittances that come in on the 1921 seed-grain loans, with the idea that we will stand a better chance to renew the 1922 loans with security than the 1921 loans.

Mr. BUCHANAN. A great many of those loans in each year were made to the same people, were they not?

Mr. ESTABROOK. Some of them were, but it is hard to say just how many.

Mr. MAGEE. How was the 1921 crop?

Mr. ESTABROOK. The 1921 crop, as a rule, was a partial crop failure.

Mr. MAGEE. What was the percentage?

Mr. ESTABROOK. I do not recall just the percentage, but there were several thousand farmers out there who made no crop at all.

APPROPRIATION ASKED FOR COLLECTIONS OF LOANS.

We are asking for an appropriation to continue the work of collections in the next fiscal year of \$20,000. It is a question of just how vigorously Congress wants the department to press these collections next year and how much money it will take. We had an emergency appropriation of \$50,000, beginning with July of this year, for collections. Up to June 30, 1923, we have actual liabilities and estimated liabilities amounting to \$37,846.

Mr. ANDERSON. Out of the \$50,000?

Mr. ESTABROOK. Yes, sir.

Mr. ANDERSON. This is in addition to the \$19,000 you spent?

Mr. ESTABROOK. Yes, sir. Apparently we will have about \$12,000 to turn back from the 1923, but \$20,000 will not enable us to carry on as vigorous a campaign next year as we are carrying on this year. At the present rate of collections we will exceed \$1,000,000 in the next two or three weeks, so that for every dollar we spend in maintaining a force of field agents up there and in sending out circulars we get back many dollars in collections.

Mr. BUCHANAN. Next year you will not have any security whatever, will you?

Mr. ESTABROOK. We are preparing to renew loans where the borrower can submit satisfactory evidence that he is unable to pay his loan, and in such cases will take a mortgage on the 1923 crop.

Mr. BUCHANAN. Will you renew the mortgages?

Mr. ESTABROOK. We will extend the loan and take a mortgage on his 1923 crop.

Mr. BUCHANAN. So that you will have some security next year to proceed on?

Mr. ESTABROOK. Oh, yes; surely.

Mr. MAGEE. Provided they will give security?

Mr. ESTABROOK. They will not get an extension of their loans unless they give a mortgage on their next year's crop. We are meeting with this little difficulty: The banks are pressing for payment and pointing out to the borrowers the fact that the Government only charges 5 per cent interest while they are paying a very much higher rate on their other loans, so that it is to their advantage to pay off their other debts and let the Government indebtedness stand. Then, too, there are many people who advise the borrowers to simply hold back, saying that it is only a question of time when Congress will cancel these loans and they will not have to pay them.

Mr. BUCHANAN. It was pretty late when we made that appropriation. Do you know what percentage of the farmers had already been

supplied with seeds at the expense of bankers and how much of this money went to the bankers?

Mr. ESTABROOK. I could not say, but every application we received contained a financial showing to the effect that he was unable to buy seed—was unable to get credit and had no seed.

FRIDAY, DECEMBER 1, 1922.

REORGANIZATION OF EXTENSION WORK.

STATEMENT OF HON. HENRY C. WALLACE, SECRETARY OF AGRICULTURE.

Mr. ANDERSON. Gentlemen of the committee, the Secretary of Agriculture is here this morning, and I am sure the committee will be very glad to hear any statement that he cares to make with respect to the Budget or any items in it.

Secretary WALLACE. Mr. Chairman, I have not come with the thought of taking up much of your time. I gather that your hearings have been satisfactory with the various people from the department. They have gone into the matters in which they are particularly interested and about which they are well informed with respect to the details. I will not undertake to go into those matters, but there are one or two subjects that I want to mention. The first is the reorganization of our extension work. I simply wish to say that we have not submitted that plan to you without very full consideration of it ourselves. That is to say, we have not casually looked over the present organization that we have there and decided that a new one would make it a lot better, and worked up a scheme from that standpoint, but we have given time to this plan which is now submitted, and we are very much convinced that it will bring about economy in the way of expenditure. It will not only result in economy but in very greatly increased efficiency in the administration of the work. That is really the chief argument for it—the increased efficiency with which the work may be conducted, rather than the amount of money saved, although there will be some very substantial savings as the result of that better system of organization.

I am very fully persuaded that that reorganization plan is a wise one. You will notice that we are asking for two places with salaries of \$5,000, one for the director of the extension work, and the other for the chief editorial man. That proposed director of extension work would correspond to the director of scientific work and director of regulatory work, which positions you have already authorized. Under the close personal direction of an efficient man, our extension work can be immensely strengthened. We have had the major attention of such a man on that work during the past year, and, as a result, I think we have made a very substantial improvement in the administration of the work. That has been done, however, largely through the close personal attention given to it by Assistant Secretary Pugsley. Much more could have been accomplished with the type of organization we are now asking. He had had large experience in

extension work before he came here, and, in fact, that was one reason why I was particularly anxious that he should come—that is, because of his experience in extension work and publication work as well. He has given the major part of his attention to that work, and, as a result, we have made real progress under the present plan, but it has been working toward this reorganization all the time.

ORGANIZATION OF A STRONG PUBLICATION SERVICE.

The other position for which we are asking a salary of \$5,000 is for a man who will be, you might say, a managing editor or editor in chief of the publication organization. Our work in that respect has never been as strong as it should be. The salary for that position has been, as I remember it, but \$3,000, and when you reflect upon the amount of money we are expending and the tremendous importance of our publication work, the manner in which the publications are put up, and the manner in which the material is presented, I think you will agree with me that we really ought to be able to pay \$20,000 or \$25,000, if necessary, to get the right sort of man to do that work. Even at that, he would save us money. I suspect that if we can get a really capable man for the amount suggested here, and I think we can, and give him six months or a year in which to get thoroughly acquainted with it, we will be able to make a saving of from \$50,000 to \$100,000 a year in our publication work. That would be just my guess from my knowledge of the publishing business. He will be able to save on what you might call the mechanical side of the work, but, more than that, he will be able to save in the manner in which the various publications are presented. He will be able to save in the matter of pages.

We have made several substantial savings, for example, during the past year just from understanding the mechanics of the business. The Printing Office can print most economically in certain units of folios, and we found that there had been a great mass of waste through the sending out of publications that might run over that profitable unit just one page. In that case, it might be necessary for them to add three other pages, or, in some other cases, seven pages, and all because there had not been close cooperation between the one who prepared the manuscript and the man who did the actual printing.

Mr. BUCHANAN. That is, in the matter of printing units?

Secretary WALLACE. Yes; in the matter of the mechanical printing units, and the editor is the man who should look after that. For instance, we will say, a publication would make 17 pages, but a competent editor could rearrange it and cut it down so as to get it within the unit of 16 pages; or, if it should run 19 pages, he might print a 20 or 24 page pamphlet as a result of that arrangement. There is great waste in that respect. There would be a question of whether it could be reduced to 16 pages, or, if that could not be done, how those additional pages could be used to the best advantage so as to get something out of them instead of waste paper. It is important that we have a capable man at the head of this editorial work, and I am very anxious that this position shall be authorized. I know that it would be in the interest of economy and of the efficient conduct of our business as well

AUTHORITY TO USE AUTOMOBILES ON OFFICIAL BUSINESS.

There is another item to which I would like to call your attention. I do not know whether you have given it special attention, or not, but should like to mention it now. That is a matter of giving us authority to use five or six automobiles in the ordinary conduct of the work of the Department of Agriculture, taking them from the used cars that are turned over from the war surplus to the Public Roads work. You understand how scattered our buildings are here, and this simply means the saving of time, especially on the part of our more highly paid men. If we had a half a dozen cars in our central garage in a pool, so that if a man should want to go over to Alexandria, Arlington, up here to the Capitol, to Bethesda, Beltsville, or to any of our outlying points, he could use one of those cars and make his trip much more quickly, and in that way save a great deal of valuable time.

MAXIMUM SALARIES PAID TO SCIENTIFIC MEN.

In the matter of maximum salaries, you gentlemen last year authorized an increase in the maximum which might be paid to scientific men. I secured this morning a memorandum of the use we have made of that authority, and I find that under it we are carrying only 6 men at \$5,500, 18 at \$5,000, and 9 at \$4,800. From that you will see that we have not abused the authorization that you gave us. The effect of this has been tremendously helpful. It was notice to the people all down the line that there was an opportunity to advance up to \$6,500, as they became qualified to fill those positions, and it has contributed in a most helpful way to build up the morale of the department. In the first place, the mere recognition of the importance of scientific work by the increase of this maximum has had a very fine effect on all of our department people. A lot of them have felt as if Congress and the heads of the Government departments had just gone away and forgotten them. A lot of them have been giving their lives to scientific work, and they look upon the action you took last year as a recognition of the importance of their work. Doctor Ball will speak to you more in detail about that. I want to express my appreciation of your action in regard to this salary limit and my acknowledgement of the helpful effect that it has been to us.

I think our budget carries a request to authorize us to increase slightly the number of places to which we may pay a few of the higher salaries, and Doctor Ball will speak to you about that also.

WORK OF THE DEPARTMENT.

On the whole the department people during the past year have, I believe, done very meritorious work. We have not been able to come to you and make reports covering a number of definite things completed, or as many things completed as we would like to report, but our work is of such a character that we can not do that. We can not go out and at the end of a calendar year say that we have completed so much this year, for much of our work is of a continuing character. A man might work 1 year, 3 years, 5 years, or 10 years on some agricultural problem before it comes to the period of fruition, but I have been very much pleased during the past year with the

manner in which our people have carried on their work. I think we have expended the money that you gave us last year to good advantage and to the benefit of the country.

I think that is all I have to say, unless you wish to ask me some questions.

Mr. ANDERSON. Mr. Secretary, I would like to ask you one question: As you have observed the development of the department and its relation to agriculture generally, what is your opinion with respect to the probable necessity of larger appropriations to reduce the hazards to plant life from plant diseases and insect pests?

INCREASED APPROPRIATIONS.

Secretary WALLACE. Gentlemen, I think you had as well make up your minds now that there will be a necessity for probably steadily increasing appropriations for such purposes as the chairman has mentioned. That is to say, as our population grows and our agriculture becomes more intensive, and as the means and necessity for communication with the outside world increase, the number of injurious insect pests and plant diseases will increase right along, and we are going to have a constantly increasing fight against both plant diseases and insect pests. That probably means steadily increasing appropriations for this purpose, or for eradication and permanent control measures.

Mr. BUCHANAN. Is there not a mistake made in the department in recommending only certain amounts, about as last year, especially in places where you have educated the public sentiment up to the point where there is enthusiastic cooperation on the part of the people in your eradication work? Where such a public sentiment exists, would it not be a better policy to use all the money necessary while the sentiment is good, because then the department could use its funds much more efficiently in stamping out or eradicating the insect pest or disease, rather than to continue it from year to year? If it is continued over a long period of years, will it not cost a great deal more money? For instance, in the matter of black rust in wheat, our hearings show that the sentiment is in fine shape to cooperate with the department in stamping it out.

Secretary WALLACE. Yes; but that is a little different from other campaigns, because in that case the eradication program is clearly indicated. In other cases it becomes largely a matter of continuing control, or in effort to check or retard the spread of the pest rather than to eradicate it. In the case of black rust in wheat, we have a straight eradication program.

Mr. BUCHANAN. Those are the cases of which I am speaking, or those in which there is a reasonable hope for eradication.

Secretary WALLACE. Then it becomes a question of how much money, assuming that you have the money available, can be spent in a thoroughly efficient manner. That is the only question to be determined there.

Mr. BUCHANAN. I entirely agree with you.

Mr. ANDERSON. We are very much obliged to you for coming up, Mr. Secretary.

Secretary WALLACE. I am glad that I have had the opportunity to come.

FRIDAY, DECEMBER 1, 1922.

MAXIMUM SALARIES.

STATEMENT OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE.

Mr. ANDERSON. We will take up the item on page 355, which relates to maximum salaries, and the committee will hear Doctor Ball on this item. Suppose you tell us what you have done under this item this year and what you propose to do.

Doctor BALL. In the consideration of this item at the beginning we agreed that one-half of the positions that you have advanced here should be used for raising the salaries of the outstanding research men of the department, so that we would be able to hold those men that we absolutely must have in order to be efficient, and that the other half should be reserved for bringing in men from the outside for positions in which we did not have in the department the leadership that we desired. As the Secretary has told you, up to the present time we have not used any of the \$6,500 maximum positions, because we have not been able to find the men who had the quality of leadership on the outside who were willing to come into the department for \$6,500.

I do not mean to say that we will not get those men, but we are finding it exceedingly difficult to induce men to come to the department even at \$6,500, and the same thing is true of the \$5,500 positions. The men whom we have considered that we could offer \$5,500 to have found it very difficult to make up their minds to come to the department at that salary. The reasons for that are three: First, that the salary standards of the Department of Agriculture are not yet comparable with the salary standards of the educational institutions from which we must draw those men—that is, from the leading universities and agricultural schools. In the second place, the retirement privileges in the Government service are not in any way comparable with the retirement privileges of the average educational institutions. The maximum retirement pay of a scientific man in the Department of Agriculture at this time is \$720 a year, while the average retirement pay for a professor in an institution is about one-half of his salary—that is, it is sometimes one-half of his salary at the time he is retired, and it is sometimes one-fourth of the sum of his salary at the beginning of his professorship and at the end. In any event, it is much higher than the retirement pay in the department.

In offering these advanced positions to men on the outside, they must, of course, be men of relative maturity, because they must have already developed leadership. That means that they have already acquired a considerable interest in the retirement privilege. It means, in other words, that it will not be long before they will be able to utilize the retirement privilege which begins in the institution usually at 60 and sometimes at 65 years of age, while the Government service with our smaller retirement pay, it does not begin until 70 years of age. The third factor, and it has been the determining factor in several cases, has been that when they come to Washington

to investigate the cost of living they decide to stay where they are. I want to put this before you simply so you can understand the problem we are facing. If the Department of Agriculture is to use efficiently and economically the money that is appropriated, we must have men of vision, men of ability, and leaders in their lines to carry on the work; so that this one little item here on this last page is more important from the standpoint of the future work of the department than much that precedes it. I hope and anticipate that that situation will be finally relieved by the reclassification system, but the Department of Agriculture can not afford to simply mark time until such time as the reclassification becomes available to us.

Mr. MAGEE. Does the reclassification bill take care of it?

Doctor BALL. The reclassification bill, of course, would abolish this legislation.

Mr. MAGEE. Will it give you sufficient salaries to get the men whom you have in mind?

Doctor BALL. That, of course, I can not say, because the reclassification bill has not been formulated yet.

Mr. MAGEE. But there is a reclassification bill pending, is there not?

Doctor BALL. It is pending, but with three changes in salaries, so that none of us have any idea what the provision will be.

Mr. MAGEE. How do the salaries there compare with the salaries provided in this section of the bill?

Doctor BALL. As reported out of the Senate committee and under the consideration of the Appropriations Committee of the Senate at this time the salaries would be very helpful to the department. I think they would reasonably meet the situation.

Mr. MAGEE. How do they compare in particular instances with these salaries?

Doctor BALL. They are very much better than these, because you have here a limitation of \$5,000, and in the present bill there are only 11 positions above that.

Mr. MAGEE. What is the maximum?

Doctor BALL. \$6,500.

Mr. MAGEE. I mean in the bill.

Doctor BALL. I can not tell you exactly. It is above \$6,500, probably above \$7,000 as a maximum for scientific workers, and approximately \$8,000 for administrative heads. They recognize administrative heads above scientific work.

Mr. ANDERSON. The Secretary made a statement in regard to the number of places that had been used. Have you those figures?

Doctor BALL. I have them in detail. The Secretary had them summarized, and I will put the summary in the record.

| | \$6,500 | \$5,500 | \$5,000 | \$4,800 |
|---------------------------------------|---------|---------|---------|---------|
| Bureau of Animal Industry..... | | 1 | 1 | 2 |
| Bureau of Plant Industry..... | | 2 | 6 | 2 |
| Bureau of Agricultural Economics..... | | 2 | 4 | 0 |
| Forest Service..... | | | 1 | 5 |
| Bureau of Chemistry..... | | 1 | 2 | 0 |
| Bureau of Entomology..... | | | 2 | 0 |
| States Relations Service..... | | | 2 | 0 |
| Bureau of Public Roads..... | | | 1 | |
| Total under lump funds..... | None. | 6 | 19 | 9 |

We are asking for what we consider to be a very moderate increase in the number of these positions, with the idea that it is as much the recognition by Congress as the actual number of positions that will be helpful to us at this time. It is not the exact number of \$6,500 places, because with 3,000 scientific workers the \$6,500 places do not mean much in themselves, but it is the recognition of the fact by those in charge that those places are needed and that they are required. That is more important. We have not filled a single \$6,500 place, but those \$6,500 places have strengthened the work of the Department of Agriculture tremendously, because they have been to the scientific people of the country, as the Secretary has told you, an indication that scientific work is being recognized and that there may be hope in the future that the pay of scientific workers in the department will again be put on a level with that of scientific workers in other institutions. The scientific workers of the department of Agriculture were paid equally with the scientific workers in the leading educational institutions 15 years ago. The department, until last year, had had no raises during all of the period in which tremendous advances had been made in other lines.

They were getting seriously discouraged, and to the point where we could not attract from the institutions even the young men at very much higher salaries than we were justified in paying to men of that character, because there was no future. To illustrate: We had a maximum of \$4,500 up until last July. We offered five well trained and thoroughly qualified young men \$4,500 last year to enter the service of the department and take the leadership in different lines, but every one of those men refused to accept such a position because \$4,500 was the maximum and there was no future for them. They would rather stay in an institution at \$3,500, in which there was an opportunity to work up to \$8,000 or \$10,000. However, this year a number of those same men have accepted those positions at the same salary simply because the Government had at least indicated that there would be an opportunity in the future for them. The result of this work has been to help us materially in getting good material to start in the lower places and that, as you recognize, is what will determine the success or failure of the work of the Department of Agriculture in 10 or 20 years from now.

COMPARISON OF SALARIES WITH OUTSIDE INSTITUTIONS.

During the war period we have hopelessly failed to get the right type of men to enter our service, and this salary increase has been of great benefit in this respect. The small addition we are asking is not at all what is necessary to meet the situation but will simply be an indication of the sentiment and will be helpful to us. I gave you last year comparisons with a good many of the educational institutions. I do not think it is necessary to repeat them except to say that in the leading educational institutions, the endowed institutions and State universities, the average salary of professors is about \$1,500 above what we can pay in the Department of Agriculture.

Mr. ANDERSON. What is that average?

Doctor BALL. The average salary?

Mr. ANDERSON. Yes.

Doctor BALL. About \$5,500, and we only have eight positions, you see, at that. That average is made up of salaries that run from

\$4,000 to \$10,000. Now, averages are deceptive, because it is not the average man who leads the work, it is the exceptional man, and all of these institutions have maximum salaries which are up to \$7,500, \$8,000, and \$10,000, and they are thereby enabled to hold the exceptional men by using those maximums.

During this year we have lost a number of our strongest men to other governments and to other institutions. On the 1st of January one of our strong scientific men is going out as the dean of one of the agricultural schools. That is good. We want to have the Department of Agriculture workers change back and forth with the State institutions; it should be so. But we want to be in a position to take them the other way. We offered the dean of a college a position with the department, but we could not get him; we simply can not get the leadership we want under the conditions that exist. We have no hope of getting a man who holds the position of dean in an institution, and yet those institutions are in a position to offer positions to our men. Five or six of our men have had an opportunity to accept deanships, but the fact that recognition was made of the possibilities and opportunities in scientific work in the department this year probably saved all but one of those men from accepting the offers, while if our maximum had remained at \$4,500 we would have lost several of those men.

Mr. WASON. Do you not think that if we made the salaries in your department comparable with the salaries of the large endowed institutions of the country you would still find the same embarrassing situation of being unable to draw leaders from those institutions that you find now?

Doctor BALL. We would have difficulty, but we would be able to draw leadership from those institutions not quite as favorably located as to salaries. There is a wonderful opportunity for a man in taking charge of a great national project, but that does not make up for inability to keep his family in decency and comfort. If we could pay enough so that a man could live in Washington comfortably, just reasonably comfortable, the same way he can live in these other places, I would have no fear of our inability to get that leadership, but we must reach that point. We do not need to bid against commercial salaries and that would not be necessary. Then, some day we must consider the question of better retirement privileges for scientific men.

The present retirement act, as you understand, is entirely based on the great body of clerks; it was not intended especially to cover scientific men. It is fairly adequate for the average salaries of the clerical force, but it is absolutely inadequate as to scientific men, so that the first need is a good salary and then good retirement privileges. When that day comes, the Government will have no trouble in holding leadership. I hope that the day will come when men will be moving back and forth freely between colleges, universities, and the Department of Agriculture, but we must have the day come when it is not all a movement out and not a movement in.

Mr. BUCHANAN. Have you any idea as to how many scientific investigators you have in the department?

Doctor BALL. We have approximately 3,740; at least, that is the estimate made a year ago. On that same basis of figuring, all the other Government departments together have about 3,200.

INCREASED APPROPRIATIONS FOR ERADICATION WORK.

Your chairman asked a question of the Secretary in regard to increasing appropriations for pests and diseases. I wish to emphasize what the Secretary said in regard to the opportunity of eliminating these overheads that are now attacking agriculture, and of many that unquestionably will be brought into this country in spite of all the efforts we make in the future. It should also be borne in mind, while you are considering those things, that that money is wonderfully well expended and that while it is a splendid investment, those appropriations must not be made at the expense of the research work of the department, which makes such things as that possible in the future. Your barberry eradication, which was referred to, has been a wonderful example of what a small amount of money spent for research has been able to accomplish in the way of offering a great relief to the agricultural people, but the whole barberry eradication campaign could not possibly have been undertaken unless that research had been carried on. So practically every eradication campaign is the result of research that must be carried on beforehand. Then when it comes to a point where you can eradicate a pest or a disease, the people are ready to support the method proposed.

Take tuberculosis eradication. They are putting up \$6,000,000 and \$8,000,000 at this time for tuberculosis eradication without as much effort on the part of our department or of your committee as there was to get \$20,000 to investigate the possibility of tuberculosis eradication some seven years ago.

So I want to emphasize at this time that this is a very much reduced budget, reduced as compared with last year and very much reduced as compared to the growth of work in agriculture in the Nation—that is, every year agricultural production is increasing; it is increasing in complexity, and it is increasing from the standpoint that each additional law passed by Congress looking toward the relief of agricultural conditions has placed added duties on the department, so that at the same time the budget of the department is increased it is increased by the addition of new duties much more largely than it has been by an increase of work in connection with the lines already being carried on. So in this budget we have tried all the way through, by as much reorganization as possible, to emphasize the research feature, to hand over to the States the demonstration and extension work and to keep that which is absolutely essential for national development in the way of maintenance of research intact. While this does not represent a budget comparable with the development of agriculture as a whole or the complexity of agriculture as a whole, it does represent what the conditions at this time warrant. I think that is all I have to say.

Mr. LEE. You have discovered that the barberry is not the only source of rust, have you not?

Doctor BALL. No; it is just the contrary. They have always believed, up until within the last 10 years, that while the rust went from the wheat to the barberry and back to the wheat that it also lived over the winter and was able to go right from the wheat to the wheat, so that the barberry was not necessary. The fundamental discovery which was made was that in the northern part of this country, from Kentucky and Kansas north, in the great wheat-growing region, this

pest was not able to live over the winter and infect the growing wheat except as it went through the barberry.

Mr. LEE. Then if you destroy all the barberries you think you will have no more rust?

Doctor BALL. If we destroy absolutely all of the barberries in the northern region, then all of the rust they could have in the northern wheat-growing section would be what blew up from the southern region, where it can live over the winter.

Mr. LEE. There was something said here last year to the effect that some other growth or host plant caused the rust.

Doctor BALL. That is in the South. The funny thing is that in the South the barberries do not carry the rust because, you see, it lives over on the wheat and does not ordinarily form the stage that goes to the barberries. So that in the South the barberries are not the carriers, but in the North they are the only carriers of rust. That is something which was not known before and it is the reverse of what was taught us in the beginning.

Mr. BUCHANAN. A gentleman appeared before us who had been sent to Europe to study this condition; he made a very thorough investigation, as the result of which it was demonstrated that in the colder climates the rust is carried only through the barberries.

Mr. LEE. I was in doubt about that because there was something in the hearings last year to the effect that they thought they had discovered some other plant.

Doctor BALL. All of us thought that, but it has now been demonstrated that the barberry is the only carrier in the northern section of the country. There are hundreds of other opportunities to take from agriculture overheads it is now carrying, like the rust, as soon as our scientific work is carried to the point where we feel sure we have the method necessary and the money necessary. We are hoping to be able to obtain money very soon to make a test of the possibility of getting those warbles out of the backs of cattle. There is no question but what it would not cost much more to take those warbles out of the backs of cattle than is represented in the damage they do in one year, and if we expended that amount of money for two years, or possibly three years, we would be rid of that pest forever. That is only one of a large number of plant diseases and insect pests which, when the time becomes ripe, we will be willing to say we will undertake to eliminate.

FRIDAY, DECEMBER 1, 1922.

NEW IBERIA (LA.) EXPERIMENTAL STATION.

**STATEMENT OF HON. W. P. MARTIN, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF LOUISIANA.**

Mr. ANDERSON. The committee will return to page 317, the item relating to experiments and demonstrations in live-stock production in the cane-sugar and cotton districts of the United States, for the purpose of hearing Senator Ransdell and Congressman Martin, in whose district, I assume, this station is located.

Mr. MARTIN. Yes.

Mr. ANDERSON. We will be glad to hear you, Mr. Martin.

Mr. MARTIN. Mr. Chairman, I want to thank you for giving me an opportunity to have this hearing at this late date. I want to state that unless I was thoroughly convinced that it would be a mistake to discontinue this stock farm in Louisiana, I would not ask for this hearing. I am entirely conscientious in the matter.

I want to state that since this matter came up last year I have instituted a thorough investigation as to the work that has been done by this station and I think it would be a calamity to the entire Gulf coast if this station were discontinued.

You gentlemen, of course, are familiar with the history of it. It was established in 1914, at the time the Underwood bill was passed and sugar was put upon the free list. It was thought at that time that our people would have to go into something else besides the raising of sugar cane. At that time hundreds of our people went into the business of cattle raising and they have continued in it ever since. Some of them are raising cattle alone and are not engaged in any other business; others are raising cattle in connection with the cane industry, utilizing the highlands for the raising of cane and the lowlands for the raising of cattle. My investigation showed me that since 1914 between 10 and 15 dairies have been established in that section of the country.

Mr. ANDERSON. Do you mean creameries?

Mr. MARTIN. No; dairies for the purpose of shipping milk and butter. By that I do not mean that people have 8 or 10 cows and utilize their surplus for the purpose of supplying the markets in the neighboring towns, etc., but I mean genuine dairies which have been erected at a cost of thousands of dollars, under the supervision of the board of health of the State of Louisiana. Many of the buildings are made of concrete and they have from 250 to 300 cows. Their butter and cream are shipped to Houston, to Galveston, and to New Orleans, those places being the markets for them. In addition to that there are from 500 to 1,000 people directly interested in the raising of cattle. I want to state that last year, at the time the discontinuance of this farm was threatened, there was a mass meeting called in that section and they passed a set of resolutions. That mass meeting, I want to say, was attended by 500 farmers and they passed the following resolutions:

Whereas the National Congress at Washington, being impressed with the necessity for securing experimental data on the live-stock industry in the cane, rice, and cotton territory of the South, established, some six years ago, an experiment station farm on 500 acres of land donated for that purpose by the State of Louisiana, and situated on Bayou Teche, between Jeanerette and New Iberia; and since this station, during the six years of its operation, has put up a series of buildings for properly carrying on investigations in beef cattle, dairying, hog raising and feeding, and in the production of mules, using in this work forage crops and the by-products of rice, cane, and cotton; and

Whereas these experiments are now well under way for securing the most valuable data for the cane, rice, and cotton section of the South: Therefore be it

Resolved, That we express to the Federal Congress our appreciation of the assistance that has been rendered in making this work a success, and that we assure them of our very great hopes for securing results through this work that will be of inestimable value to the people of the South. The results of experiments in determining the kinds of pasture crops, silage, and forage that can be most profitably used in dairying, in the raising of hogs and steers, has created a great interest in this work on the part of people who have seen the results. There is no data at this time comparable to that which is now being secured by the Iberia Live Stock Experiment Farm in establish-

ing the feeding value of the by-products of rice, sugar cane, and cotton in the production of live stock and live-stock products; therefore be it further

Resolved, That we earnestly request our Representatives in Congress to urge upon that body the necessity for placing the Iberia Live Stock Experiment Farm on a basis that will insure a continuation of these investigations for at least several years to come.

These resolutions were passed too late last year, Mr. Chairman, for me to present them to the committee.

Now, gentlemen, I want to call your attention to some of the work that this farm is doing. I have in my hand the Livestock Reporter that is printed at Fort Worth, Tex., and I want to read this to you for the purpose of showing that Texas is directly interested in the maintenance of this farm. It is the only stock farm on the Gulf coast; they are making studies in other portions of the country but there is no other farm of this kind on the Gulf coast.

TEXAS STEERS, FINISHED IN LOUISIANA, THEN SOLD HERE, MAKE BIG RETURN.

Iberia Experiment Station sells two cars of cattle on this market at \$8.75. Louisiana offers good field for cattle business.

Two cars of fed steers from the Iberia Experiment Station at Jeanerette, La., finished for the purpose of determining the food value of different rations and also to afford a comparison in gains between native Louisiana cattle and those of better breeding from other States, were sold on the Fort Worth market late Saturday at \$8.75, a new top for the year.

Mr. ANDERSON. What is the date of that paper?

Mr. MARTIN. The date of the paper is Monday, May 1, 1922.

The steers averaged 962 pounds and were purchased by Swift & Co. All were dehorned.

J. R. Quisenberry, live-stock specialist in charge, who accompanied the shipment to market, explained that one car consisted of Hereford cattle purchased last spring from the Scharbauer Cattle Co., of Midland, and the other load was made up of native Louisiana steers produced from grade cows bred by Hereford bulls.

Results of the experiment were favorable to the native Louisiana cattle. At the completion of the test they outweighed the Texas steers, and they made faster gains both when on grass and when on feed. However, the Texas-raised cattle made splendid advancement, regardless of the fact that they were taken to strange pastures where conditions were much changed, the country being low and marshy, and their performance was most creditable as well as profitable. The experiment tends to show that Texas cattle are well adapted to the Louisiana climate, and, when properly handled, will make gains similar to those of the native Louisiana steers. After all expenses had been figured, freight charges from Midland to Jeanerette and then back to the Fort Worth market included, the Texas steers produced a profit of around \$4 per head.

That was the result obtained from steers shipped to the Fort Worth market after having been fattened on this farm. I want to state in connection with this, that during this same year they had something of a drought in Texas and hundreds of cattle were shipped to the low lands of Louisiana and put on what is known as paye Finne hay, which grows wild in the lowlands. They were all taken to Louisiana, fattened there and sold on the market at a good profit.

In connection with that I want to tell you about some other work that is being done there. The sugar farms of Louisiana are cultivated almost entirely by what is known as the Kentucky and Missouri mule. I do not know whether you know them or not but they are very large mules, and it takes a very large mule to break up the stiff land where cane, corn, and cotton are grown. The price of those mules runs from \$250 to \$300 apiece, so that this farm has been experimenting in the raising of mules and they have found that just as fine mules can be raised in that section, just as large and give just as

good results, as can be raised in Kentucky and Missouri. Here is a picture of one of the mule colts and a couple of mules pretty nearly grown. These were raised upon that farm.

In addition to that, Mr. Chairman, they have made a specialty of raising hogs. Heretofore we thought that the only way we could raise hogs in the South and in Louisiana was by feeding them corn; that was rather expensive, because most of the corn raised was utilized for the purpose of feeding the mules, and we really do not raise enough corn on a sugar farm to feed the mules. We rotate; one-third of a plantation is planted in corn and two-thirds in cane; but that one-third will not feed the mules. It takes from 10 to 20 mules to cultivate 100 acres. They feed all of the corn raised before the end of the year and then have to buy some feed of some kind. It is usually a mixed feed; they mix the feed and utilize their by-product of blackstrap for the purpose of mixing it with the feed. But they have found that we can raise plenty of hogs by utilizing the by-products of rice and forage and not using any corn at all. This picture shows some of the hogs that have been raised on that farm in that way and, gentlemen, you can see the condition they are in.

Now, Mr. Chairman, I want to direct your attention to the way in which the results of the experiments on this farm are disseminated among the farmers. It is done in two ways. In the first place, about twice a year they hold what they call a field day; people from all over that section gather on that farm and the superintendent of this farm and Doctor Dodson, who is a member of the committee appointed by the Secretary of Agriculture to help run the farm, exhibit the cattle, give lectures to the farmers, and tell them of the results of the experiments. In addition to that the State of Louisiana, through its experimental station, puts out a bulletin two or three times a year giving the results of all of the experiments as to the feeding and the raising of cattle that have been conducted on this farm, and these bulletins are generally distributed throughout the cattle-raising section. Besides that they have boys' clubs that are interested in the raising of cattle and pigs; they bring them down to the farm and lecture to them. Here is a picture of one of the boys' clubs on that farm. Here are some more of the cattle that are on it.

Now, Mr. Chairman, I want to make this statement: When I heard that the Department of Agriculture had recommended the discontinuance of this farm Senator Broussard, Senator Ransdell, and myself went to see the Secretary of Agriculture, Doctor Mohler, and Doctor Taylor, to find out whether they had made such a recommendation. Every one of these gentlemen said most positively they had not; that they had included in their recommendations the experimental farm at Iberia and that they were strongly in favor of its continuance, that it had done good work, but they said that when they went before the Bureau of the Budget they were told they had to cut down certain items. Among those they had to cut down was the appropriation for the cattle tick and the appropriation for hog cholera; then they were told that they had to cut down certain of these experimental farms, and they said they recommended the discontinuance, I believe, of two, one in Oklahoma and the farm at New Iberia, for the reason that the financial returns of these farms were not equal to those of other farms in the country.

Now, I want to state that so far as the New Iberia farm is concerned the returns have averaged between \$7,000 and \$20,000; the average, I should say, was between \$13,000 and \$14,000 from that farm, and I think you will find that in 1922 there was an appreciable increase in the returns, so that this amount must be taken from any appropriation that is made by the committee because that amount is returned to the Treasury. But, Mr. Chairman, the good that that farm is doing in that section of the country is certainly worth more than \$20,000 or \$25,000 to this country. I think if you could see the interest the people in that section are taking in stock farming and the great number that have gone into the cattle business—and I have stated that there are between 500 and 1,000 actually engaged in the business—and the dairies that have sprung up all over the country, I do not think you gentlemen would entertain for a minute any suggestion of its discontinuance.

Now, Mr. Chairman, if there are any questions that you gentlemen desire to ask in regard to the operation of this farm I will be very glad indeed to answer them.

Mr. ANDERSON. I have the impression that the people not only in Louisiana but throughout the coastal plains area of the South ought to have considerable help with their stock problems, but along with that, so far as this particular station is concerned, I have the impression that the station is not well located.

Mr. MARTIN. Well, I know how you got that impression, because you were kind enough to tell me last year, but I want to state that that is a mistake. To begin with, I want to describe to you the country down there. This is located on Bayou Teche. Our country is all alluvial. The highest point there is not 10 feet above sea level.

Senator RANSDELL. He means land that has been made by the overflows of the Mississippi River.

Mr. MARTIN. When you begin at the Teche the land is rather high; then it begins to slope back and reaches what is known as the swamp. The front portion of that land will grow anything in the way of corn, hay, oats, alfalfa and clover.

Mr. MAGEE. Is it black soil?

Mr. MARTIN. No; that is sandy soil; but when you go back you gradually get to the black soil that is subject to overflows. That soil grows a hay which, in food value, is way beyond either alfalfa or clover. It is a hay known as paye Finne. It grows in abundance where the soil is damp; it grows wild down there but it can be transplanted. You can dig it up by the roots, transplant it, and it will grow very well in other places.

Mr. LEE. Is it anything like Bermuda grass?

Mr. MARTIN. No; it is not. The cattle will go up to their stomachs in mud to eat this paye Finne hay and get fat on it in the winter. You do not have to feed them when they eat paye Finne hay; you do not have to feed them anything at all but let them feed on this paye Finne hay, because it grows as well in the winter as in the summer.

Senator RANSDELL. Tell them about the factories which are making paye Finne feed.

Mr. MARTIN. We have two factories down there which, since this experimental station has established the value of this paye Finne hay, are manufacturing a mixed feed the base of which is paye

Finne hay, and those factories are selling it all over this country. They are using this paye Finne hay: they are using a little corn and a great deal of blackstrap molasses; they are making a mixed feed of those things and are selling it all over the country for dairy purposes and it is being very extensively used. So it seems to me there is nothing to the argument which the Agricultural Department puts forward with regard to the land being too low. We can raise something else on the highlands, but the lowlands are splendidly adapted to cattle feeding, and all of these cattle I spoke of as coming from Fort Worth, Tex., brought there and fattened up and sent back, were turned out on this paye Finne hay.

Mr. MAGEE. Did you say how many acres there are in this farm?

Mr. MARTIN. I will give you the acreage exactly. The Louisiana Legislature on July 9, 1914, transferred 500 acres to the Agricultural Department for this farm:

On February 7, 1918, 4.658 acres of land were deeded to the department by Peter E. Sandager for the purpose of supplying an entrance to the farm from the public highway.

Under date of April 15, 1915, a plot of 20.45 acres of land was leased to the department for additional pasture lots, this lease to run until June 30, 1925.

During the month of March, 1917, the department, under an agreement with the Louisiana State Experiment Station, was given the use, for experimental work, of 500 additional acres of land occupied by that station.

So there are approximately 525 acres.

Mr. MAGEE. Was this deeded to the Government outright or just given for experimental purposes?

Mr. MARTIN. It is given by the State for just as long as the Government wants it, free of any charge.

Mr. MAGEE. Are these 500 acres or more made up of sandy land and alluvial land?

Mr. MARTIN. This farm takes in both.

Mr. MAGEE. In what proportion?

Mr. MARTIN. I should say that about 300 acres are sandy and about 200 acres in the lowlands. The Bayou Teche runs for a great many miles. I made a mistake in the number of acres in this farm. It is 1,025 acres but the proportion of black and sandy land is the same.

Senator BROUSSARD. It runs for 80 or 90 miles.

Mr. MARTIN. And this same stretch of land goes right along there. All of our country is built up of bayous—Bayou Teche, Bayou La Fourche, or some bayou; the land being on the bank of the bayou, runs back and finally reaches the swamp. The live stock, buildings, and machinery on that farm are valued at about \$70,000. There are some very fine buildings on it, and these would have to be torn down and would go to waste in the event the Government discontinued the farm.

Now, Mr. Chairman, I have taken up about as much time as I feel I ought to. Senator Ransdell has been on this farm and seen the work; Senator Broussard lives within a mile of this farm and is himself a cattle raiser. He has a cattle farm within a mile or two of this one, where he has 250 or 300 cattle, and he can tell you the results he has obtained from this farm.

Mr. BUCHANAN. Do they raise these crops on the high or low lands?

Mr. MARTIN. They plant in both.

Mr. BUCHANAN. Is there any question or difficulty about the drainage of these lands?

Mr. MARTIN. I know there is not in connection with the land on which this paye Finne hay grows, because that raises itself. As to the other land, there is natural gravity drainage back toward the low lands; the drainage is toward the swamp and not toward the bayou.

Senator RANDELL. Has it not the same drainage that the sugar lands in that entire section have?

Mr. MARTIN. The same kind.

Senator RANDELL. As I understand it, these lands have the same kind of drainage that the lands have which are adapted to the growing of sugar cane and other crops.

Mr. MARTIN. Dr. W. R. Dodson, the dean and director of the Agricultural Experimental Station in Louisiana, and who is one of the committee in charge of this station, has wired me that he has forwarded a statement setting forth the important work being done by this farm. Let me say that Doctor Dodson is most highly thought of in the State of Louisiana and has done a great deal in the way of getting our people interested in cattle raising. His statements can be absolutely relied upon.

I would now like to have you hear from Senator Broussard.

STATEMENT OF HON. EDWIN S. BROUSSARD, A SENATOR FROM THE STATE OF LOUISIANA.

Senator BROUSSARD. I do not know what particular facts you would like to inquire about, but I would be pleased to answer any questions the committee desires to ask.

Mr. LEE. Tell us about your farm.

Senator BROUSSARD. I am very familiar with this particular land; in fact, at one time this plantation, before the State acquired it, was owned by my father-in-law. This land is just alongside of and was taken from the convict farm, what we call the Hope State farm, which is a convict farm.

Senator RANDELL. How far is your home from this farm?

Senator BROUSSARD. I live at New Iberia, which is about 6 miles from there, but I was born and brought up just 4 miles from there, in another direction. I might say this, that the Hope farm is the one farm belonging to the State that has always paid; it pays money every year, when other farms have lost money occasionally. There is some black land in this farm; in fact, if you understand the alluvial formation, the highest points are next to the streams and all the lands drain away from the streams. The land close to the streams is usually very sandy and then it changes until in the rear it gets to be, in some places, black soil.

Mr. LEE. The black soil is more productive, is it not?

Senator BROUSSARD. It is at certain seasons of the year, when you get much better results than you will from sandy soil.

Mr. ANDERSON. The difficulty the department presents, as I understand it, is that this black soil, particularly at certain times of the year, is very wet, and that it is very difficult to get on it in order to do the necessary work in preparing it for crops, and that it has a tendency to become very hard when it dries, and that the consequence

of this situation has been that the farm has not produced enough to support the number of cattle they have had there, necessitating the importation of a considerable amount of feed, which has made the station very expensive to maintain. That, as I understand it, is the sum and substance of the proposition for discontinuing it.

Senator BROUSSARD. If you are familiar with the distribution of the land there, all the pastures are on the bayou front; that is, all the sandy soil. If any sandy soil was sought that could be rearranged, and you could have your sandy land under cultivation, or a part of it under cultivation. As I remember the farm, all the bayou front, and what is the most sandy part, is in open, pasture land. Of course, it has been planted in different grasses, and I think it is one of the finest pastures I ever saw in my life. It takes a few years to do that in that country, but you can have pasture green all the year round, and that pasture is green all the year round.

Mr. BUCHANAN. Then why should they have to import feed for the stock?

Senator BROUSSARD. Well, now, I could not answer that, sir.

Mr. LEE. Probably you have too much stock for the acreage.

Senator BROUSSARD. I am satisfied that land can produce as much as any land in that vicinity, and the Department of Agriculture will show you that those lands are the most productive lands in the State.

Mr. ANDERSON. How much land is there in this section which is of the same general character as this farm?

Senator BROUSSARD. All of it is of that same general character on that side of the bayou. On the other side the sandy formation extends up to what was formerly an old lake bottom that has been drained, and all of that is sandy.

Mr. ANDERSON. Your statement that all of it is of the same general character means something to you because you are familiar with the territory, but of course it does not convey anything to me because I am not. In acres or square miles how much of that territory is of the same general character?

Senator BROUSSARD. On that side of the bayou I should say it is all of that character.

Mr. ANDERSON. I do not know whether that side of the bayou has 40 acres or 40 square miles.

Senator BROUSSARD. What are you trying to get? The area of land of that kind in the State?

Mr. ANDERSON. In general terms; yes.

Senator BROUSSARD. Or do you mean in that county?

Senator RANDELL. He means in the State.

Mr. ANDERSON. In that general section how much territory would there be?

Senator BROUSSARD. If I covered the State I would have to give you a larger figure than if I covered the county or parish. Do you want to know what proportion of the lands in that country are that way?

Mr. ANDERSON. That might be helpful, perhaps.

Senator BROUSSARD. I can not give figures unless I have a basis upon which to estimate, but I should say that possibly one-third or one-fourth of the lands are that way.

Mr. BUCHANAN. About how much is that in acres? Just guess at it in acres or square miles.

Senator BROUSSARD. In the parish?

Mr. BUCHANAN. In the parish and in the State.

Senator BROUSSARD. I would not know about the State, but in the parish I have given the proportion of that character as one-third or one-fourth.

Mr. BUCHANAN. Would that be 1,000 acres?

Senator BROUSSARD. There are something like—I do not recall now the exact acreage of that county.

Senator RANDELL. Are there not a great many acres of land of that character in adjoining parishes?

Senator BROUSSARD. Yes, sir.

Senator RANDELL. Thousands and thousands of acres of the same general character?

Senator BROUSSARD. All through the State, but I would not know the proportion in the different parishes.

Mr. BUCHANAN. You can readily see our idea. You want to have an experimental farm on a certain character of land in order to see what it will develop, and it is necessary for us to know about how much land there is.

Senator BROUSSARD. I think Mr. Martin has already testified that there are about 300 acres of this land, that is, sandy land, and that the other 200 acres are black lands. Now then, I would say that possibly one-third or one-fourth of the lands of that parish are just of that character, I mean, of the character of the black lands.

Mr. BUCHANAN. How large is the parish?

Senator BROUSSARD. It is about ten miles long and about eight miles wide.

Senator RANDELL. May I say that fully one-third of the lands of the State of Louisiana are of this same character, and the same problem you have in raising cattle on this farm is the same problem they have all over southern Louisiana.

Senator BROUSSARD. Not only as to the black lands but it is the same problem they have on the Gulf coast. We have different types of land; we have these alluvial lands and then we have hill lands, of course, which are not included and they are red clay, but this character of land would apply to all the land along the Gulf coast.

Senator RANDELL. Taking this section as a whole, is it not a fair type of the sugar-cane lands throughout Louisiana?

Senator BROUSSARD. As I said before, I have known this land for years, my father-in-law having owned it, and he made crops on the land which now forms this farm. These 500 acres were taken out of the Hope farm, and the State has given it over to the United States Government free of charge. This is the best paying farm the State has and these are just 500 acres taken off the western portion of that plantation; there was no selection made but just a line drawn and that many acres given over to the Government. However, the State is cultivating lands much farther back than this farm land, lands that have been reclaimed since the convicts were there. When there is nothing else to do they go out in the woods and clear this land; it is then put under cultivation and it is productive.

Mr. BUCHANAN. Does this land extend to the sea or the Gulf?

Senator BROUSSARD. No: it is on the opposite side of the bayou from the sea.

Senator RANDELL. But taking it as a whole, does not this plantation fairly well represent the character of the sugar section of Louisiana?

Senator BROUSSARD. Absolutely. If you take Bayou Teche, for instance, or any of the other bayous along there, you will find the land being grazed and cultivated, and on that particular side of the bayou the character of the land is a little different than it is over on the other side.

Mr. BUCHANAN. Then, there must be some mismanagement of the farm.

Senator BROUSSARD. I think not, but it may be that they have not gone into agriculture extensively enough. They certainly should be able to raise their feed.

Senator RANDELL. You are engaged in cattle raising in that section, are you not?

Senator BROUSSARD. I have two stock farms.

Senator RANDELL. Have you been benefited materially by the experiments carried on at this farm?

Senator BROUSSARD. Well, I will tell you what occurred shortly after this farm was established. We got the people who had lots that were vacant and others that were not paying very much. Two or three of us got together and bought, the year after this farm was established, two carloads of Durham bulls. We have imported a number of the finest breeds that this country affords and our people have gone into this. I went into it immediately after that and I can name fifty people in my immediate locality and others as far as Texas. This is the only farm on the Gulf coast, and at the last meeting they they had, last summer, I could not go, but there were people there, so I am informed, from Texas clean up to the Mississippi line and some of them from Mississippi.

Senator RANDELL. About one thousand people were there?

Senator BROUSSARD. Yes, sir; and they have stock of the finest kind, which they started to raise after this farm was established, so that it has been of immense benefit to our people.

Senator RANDELL. Are you familiar with the food value of paye Finne hay?

Senator BROUSSARD. The Department of Agriculture has issued a bulletin in which they compare it to alfalfa.

Senator RANDELL. How does that grow?

Senator BROUSSARD. It grows in the lowlands, in the wet lands, and is green the year around. It is now being baled, or experiments are being made now to cure it so as to bale it. It grows all through that country.

Mr. WASON. That is a native or wild grass?

Senator BROUSSARD. It is a wild grass; it grows all winter and the stock will remain in those lands all winter. My own stock will leave the highlands in the month of November and we never get them out until the 1st of March, unless we want to sell them.

Mr. WASON. What proportion of the entire acreage of your State would you say is of the same type of land as on this experimental farm?

Senator BROUSSARD. I will answer that by first eliminating the hill lands, which will not compare at all in fertility or production, and are altogether of a different character; but all of our alluvial lands—I mean by that south of the Red River, and on the east side of the Mississippi, south of Yazoo City, there are some places where there are alluvial lands, but all of the lands on our side of the river, south of the Red River, are lands of this type; they are lowlands; there is not much elevation there, but they are very fertile. The lands fronting on the streams are sandy because of later deposits from the Red River, but the black lands are always lands of the character described. Most people prefer the black lands under certain weather conditions. When you have extreme drought your crop is fine on these lands, but if you have too much rain it is hard to work them; that is the difficulty, but they are more productive and year after year will average more than your sandy lands.

Mr. WASON. For my benefit, and perhaps for the benefit of the other members of the committee, will you state the percentage of alluvial lands—and I group the alluvial lands and sandy lands together—and hill lands as compared to your entire acreage?

Senator BROUSSARD. When I said one-third or one-fourth awhile ago I did not mean that is the total area of black lands as compared to sandy lands; but the people usually work the front lands as they are more easily drained. If you want the proportion of black lands in the alluvial section as compared to the sandy lands I should say that over half is black, but as to cultivation I should say there is one-third of it in cultivation. All of the fields in the rear are black lands.

Mr. BUCHANAN. But taking your State as a whole and counting the alluvial lands and the black lands that constitute the section where this farm is located as one unit, how would that compare with your State as a whole—one-fourth, one-fifth or one-eighth?

Senator BROUSSARD. I suppose one-fourth or one-fifth.

Senator RANSDELL. I am pretty familiar with that because I have specialized on flood control. We have in Louisiana around 14,000 square miles of lands which are subject to overflow from the floods of the Mississippi River and all of that land is the kind of land which Senator Broussard has described. Now, we have a considerable area in and along streams—we have a great many streams in the State—and much of that is of the same general character. The whole State is between 46,000 and 47,000 square miles, but there are some 14,000 square miles of the same general character which the Senator has described. I am familiar with the whole State.

Senator BROUSSARD. This black land extends as far as the Arkansas line along the river, while the hill lands are in the northwestern part of the State and are pine lands. That character of farm lands extends along the Gulf coast, and this farm is not to be considered merely for our immediate locality. We have always viewed it as one for experimental and demonstration work for all of the people along the Gulf coast. This is the only one in that area. About one-third of the State is of that character of land.

Senator RANSDELL. Do they not have in all that region this stiff land that may be benefited by the experiments on the farm?

Senator BROUSSARD. Yes; it is of the same formation. The land along the Black and Ouachita Rivers, in upper Louisiana, are of the same formation as this. There is a number of bayous and rivers up

there, including the Ouachita, the Black, and the Red Rivers, and all of those lands are of the same formation.

Mr. WASON. That agrees with the statement of Senator Ransdell that more than one-third of the acreage of Louisiana is of this type of land.

Senator BROUSSARD. Yes, sir; it is considerably more than that.

Mr. WASON. And that is typical of much more land extending eastward and westward into other States along the Gulf?

Senator BROUSSARD. Yes; it is of the same formation, because there was no distinction made by nature in the formation of those lands. They are all of that formation, extending along the Gulf coast from the Rio Grande to Florida.

STATEMENT OF HON. JOSEPH E. RANSDALL, A UNITED STATES SENATOR FROM LOUISIANA.

Senator RANSDALL. Mr. Chairman, the subject has been so fully covered by Congressman Martin and my colleague, Senator Broussard, that I do not know that I can add much to the discussion. I live in a district of this same formation, in the extreme northeastern part of the State, next to the Mississippi River, where we have some trouble with overflows, just as they do in the lower part of the State. I might say in passing that if it were not for the levees on the banks of the Mississippi River the great city of New Orleans would be overflowed and an area occupied by considerably more than one-half of the population of the entire State of Louisiana would be overflowed. Therefore, when I speak of the territory subject to overflow, you must bear in mind that that includes a great deal more in point of population than half the State of Louisiana. That, again, includes a vast territory, and we want to do something to take care of the agriculture in that great alluvial territory, and not alone in our State, but covering the coastal plain in the States of Texas, Mississippi, Alabama, and Florida.

I saw Mr. Quisenberry, the chief of this farm, about two weeks ago. I spent a day there, and went over the farm. I had heard a great deal about the farm and was very much interested in it, but I had never seen it before. I asked him about the conditions there, and I found that the experiments being made there were applicable to the entire coastal plain of the State beyond question. I asked him if what he was doing there in the way of benefiting the livestock industry, particularly relating to cattle, mules, and hogs would be applicable to all of the Gulf Coast section, and he said he saw no reason in the world why it should not be, because there is a very great area of land of like character in all of the Gulf Coast States, where the conditions are very similar to the conditions at this farm.

Gentlemen, I went over that farm, and I was delighted and surprised at what I saw. The buildings there are very fine. They have a splendid group of silos, for instance, and immense barns, and they are modern, up-to-date barns. There are splendid arrangements for the handling of dairy cattle, and ideal houses for hogs, or for breeding hogs. I do not see how the condition, could be much more advanced or much more favorable than they are at this farm. I went out among the cattle, and there must have been 75 or 100 of as beautiful animals as I ever saw. They were ready

then for the market, and Mr. Quisenberry told me that they had not had one pound of feed except what they got on the natural pasture. I went out in the pasture, and out on the black lands in the rear, that so much has been said about. I found there a beautiful growth of Bermuda grass. Some of you know what Bermuda grass is. In a portion of it there was a wonderful growth of white clover. It was fine, and certainly the cattle had thrived upon it. They had gotten very fat, and were in splendid condition on the native pasture.

You will bear in mind, gentlemen, that the trouble on these lowlands does not occur for usually more than 60 days in the spring of any year. They had some trouble last spring, which you heard about, from the great overflow in the Mississippi River. A large area of land in the State was overflowed. There was a break of the levee in Concordia Parish, and there were two breaks below New Orleans. We had a great deal of destruction there. The high water backed up on some parts of this farm and did some damage, but it was only temporary damage. The grass continued to grow. Water does not hurt Bermuda grass, and I have seen the most beautiful crop of Bermuda grown on land that had been overflowed for 60 days and sometimes for 90 days. As a matter of fact, the grass is benefited by that overflow, and you must not be bothered about that. You must bear this thought in mind, that this farm was put there originally to help the people of the sugar section on the Gulf to combat this condition and to help them make a crop of some kind in addition to cane on the lands subject to overflow. When a sugar plantation is overflowed and the seed is destroyed, it costs a good deal to reseed it. You do not put sugar cane seed in the ground at an expense of one or two dollars per acre, as can be done in the case of most other crops, and some of them for less than that, but it costs a very large sum. I can not tell you how much.

Mr. BUCHANAN. You must get the cane and plant it.

Senator RANDELL. Yes, sir; you must get the cane itself and put it in the ground, and that is quite an expensive proposition. Furthermore, the people with statesmanlike vision, when in 1914 they were threatened with the absolute destruction of the sugar industry in Louisiana, realized that something else must be produced. That applies not only to Louisiana but to a portion of Texas, and it is something of an industry now in Florida. They felt that it was necessary to do something in that section to build up a live-stock industry. They felt that any genuine agriculture must be based upon live stock anyhow. It was then we asked Congress to show us how to raise cattle in Louisiana in the sugar-cane section, so that if the sugar planters were put out of that business they could do something else that would be profitable. They were also extremely anxious to have some kind of industry carried on on those heavy black lands which are on the rear of every plantation practically in that country. I have them on my place, and everybody knows it. Certain portions of this area would be very fine for cane. Other portions for corn, or, perhaps, for cotton. In many sections they were fine for rice.

We wanted to have some kind of agricultural industry in addition to cane, cotton, or rice, and we did it at it. We had been a one-idea people in Mississippi where cotton was king. In western Louisiana

in another section rice was king. We desired another kind of agriculture, and the Government established that farm for the purpose of assisting in the establishment of other kinds of agriculture. I want to say to you that it has been very helpful, and it should not be disestablished. When I was at the farm, I asked this question, "Have you found out all you can?" He replied, "No, Senator, we have not." They showed me some of the most beautiful mules I ever saw. I said, "How about the mule business? Have you demonstrated thoroughly that it can be made a success here?" He replied, "No; we have proved that we can raise mules here as cheaply as we can buy them, but no cheaper. We have had certain serious problems in the foaling of our mares, and we must work out those problems. We have had a number of things that were difficult, and which we have not yet satisfactorily determined." He said, "We feel that the cattle business is extremely promising and we feel that the hog business is extremely promising, and we believe that the mule business will be."

Gentlemen, if you should be carrying on a farm in one of the sugar sections of Louisiana, or in any of the sugar sections along the Gulf coast, and in those other States I have mentioned, you would realize that this service is worth incomparably more than this small sum of \$20,000 or \$25,000. I do not know what the exact cost is, but it would be most unfortunate to stop those experiments while they are right in the midst of things. It would be most unfortunate to give up this very extensive plant that has been established there. I am thoroughly convinced that it is a good thing, and I hope you gentlemen will carry it on, in accordance with the wishes of the Secretary of Agriculture, of Doctor Mohler, the Chief of the Bureau of Animal Industry, and of Doctor Taylor, the Chief of the Bureau of Plant Industry. I have seen all of them, and they approve it and want it done; but, of course, they had to concur in the action of the Budget Bureau.

Mr. BUCHANAN. How many more years will it be necessary to carry it on?

Senator RANDELL. I can not tell you; but Mr. Quisenberry said it would require at least five or six years. However, I do not believe it would be an indefinite thing. It should go on for a reasonable number of years.

Mr. WASON. I do not know much about your country, and this is probably a foolish question to ask: The necessity for mule production there is for farm power?

Senator RANDELL. Yes.

Mr. WASON. Is there any substitute for mules there?

Senator RANDELL. We are using tractors very extensively. I use a tractor on my plantation, and it is a very valuable thing; but we can not dispense with the mule. If we were to get rid of the mule, we would have to give up the negro. The negro and the mule go together. Negroes have never displayed the requisite intelligence to operate tractors successfully. Besides, there is a great deal of cultivating which must be done with the aid of work animals, either mules or horses. We prefer mules to horses down there, but we are using tractors quite extensively.

Mr. MARTIN. The tractor is used a great deal for the breaking of land, but when it comes to the cultivation of cane and harvesting the same, you must use mules.

Mr. ANDERSON. Is this station operated in cooperation with the State?

Senator RANDELL. I do not understand that it is.

Mr. MARTIN. There was a committee of three appointed. I do not know who the members of the committee are, but I think that Doctor Taylor is a member, and Doctor Dodson, who is in charge of the State experiment farm, is on that committee. Doctor Dodson does some work for that station, and gets out bulletins.

Mr. ANDERSON. The State does not contribute anything toward the maintenance of the station?

Mr. MARTIN. It only contributes the land. I want to state that I have a telegram from Doctor Dodson here, that came this morning. I wanted a statement of the work done by that farm, and he telegraphed me on the 29th that he was mailing a statement regarding live stock. When that statement comes in, I would like to submit it for insertion in this record.

Mr. ANDERSON. That may be done.

Senator RANDELL. We thank you very much for this hearing.

Mr. ANDERSON. We are much obliged to you for your statements. (Doctor Dodson's statement is attached hereto.)

BATON ROUGE, LA., November 28, 1922.

Mr. W. P. MARTIN, M. C.,
Washington, D. C.

DEAR MR. MARTIN: I have just received your letter of the 24th stating that the Budget Committee had recommended the discontinuance of the Iberia live-stock farm and had recommended an appropriation of only \$5,000 for helping to dispose of the equipment.

I think it would be a serious mistake to stop this work at the present stage of its development and I hope that the Appropriations Committee may favor a continuation of the work now in progress until such a period as the most important projects now under investigation may be completed.

Louisiana donated 500 acres of land to the Federal Government for this work. The experiment station rented 500 acres additional and turned it over to the Iberia live-stock farm for three years. Since that time the rental has been donated by the State penitentiary board.

When the experiments were begun the soil was very much depleted from the continued harvesting of cane and rice, but it was representative of the type of land that will be devoted to live stock or agricultural purposes other than the production of sugar cane and cotton, as we develop new enterprises to supplement these two chief industries.

There have been a great many difficulties to be overcome; for instance, in getting good pastures, in completely eradicating cattle ticks, and in other ways that represent pioneering work along the lines projected when the station was established.

The major projects undertaken there have been along the line of growing and feeding beef cattle, the establishment of a dairy herd, the breeding, grazing, and fattening of hogs, and the production of mules. Coupled with each of the four major projects, of course, has been the problem of producing crops most suitable to the animals to which they would be fed. Any one of these projects will require the results of several years continued operation before dependable conclusions can be drawn.

Last year, for the first time, we were able to market a considerable number of beef cattle that had been developed wholly on the crops grown at the station. This year the second crop of calves will soon go on the feed and we are just now reaching the point where valuable data will rapidly accumulate, if the work is continued.

In the growing of mule colts we have encountered many difficulties that were not anticipated, but the experience is such as to indicate means of overcoming these difficulties, and the continuance of the work ought to give some valuable results in two or three more years that will be well worth all the expenditures that we have made on the experiments.

The results that have been secured in the feeding of rice by-products to hogs during the past two years have given us a great deal of valuable information, but they ought to be repeated for at least two or three years more to make the data most dependable.

By the process of elimination we are finding the crops that are best suited to our needs, and time enough ought to be allowed to further verify the value of the ones that have seemed to be the best. Previous to last year, in using Japanese sugar cane as a silage crop, feeding tests were not satisfactory, but last year we found that by adding 800 to 1,000 pounds of Biloxi soy beans to each ton of Japanese cane in making silage we could secure as good returns when the product was fed to beef cattle as we secured from corn silage. It took a good many experiments in different combinations to find out this fact, or at least what seems to be a fact, from last year's results. We ought to go on now and thoroughly verify conclusions that seemingly were justified by the results of the past year.

I have heard that some statements have been made to the effect that the people have not taken a sufficiently active interest in the work at the Iberia farm. They were very much interested at the time of the inauguration of the work and have patiently waited for results. They have understood that a good many failures were to be expected and that they should not jump at conclusions from the results of single tests.

At the field day meeting last spring we had a large attendance of sugar planters and farmers from south Louisiana and a few from Texas and Mississippi that were intensely interested in the progress of the work that was evidenced there. About 500 attended a meeting that passed resolutions commending the work there and asking for the continued support of the Federal Government.

A large investment is tied up now in buildings, equipments, and live stock that will be almost a complete loss if the work is discontinued. The live stock will furnish a great deal of valuable information if the experiments are carried on, but the data regarding them up to date will be very incomplete and less valuable if the work is stopped now.

It is needless to remind you of the deplorable conditions that would prevail if the sugar industry were to be destroyed before we have established enough dependable information to serve as a foundation for building up a new agriculture in the Gulf coast region.

The Government is spending a large amount of money for investigational work calculated to be of service to other sections of the country, and the amount that we are asking for is not more than we have every right to urge.

I very much hope you will be able to convince the committee that the work of the Iberia live-stock farm should be continued.

I am sorry that I was not able to attend the conference of officials of agricultural and mechanical colleges recently held in Washington, so as to have discussed this matter with you at that time.

Mr. Quesenberry promised to send an outline of the several projects that he has under way and some photographs of the live stock on the farm. I have just talked to him over the phone, and he says he will get these off to you at once.

With most cordial good wishes, I am,

Very truly yours,

W. R. DODSON, *Dean.*

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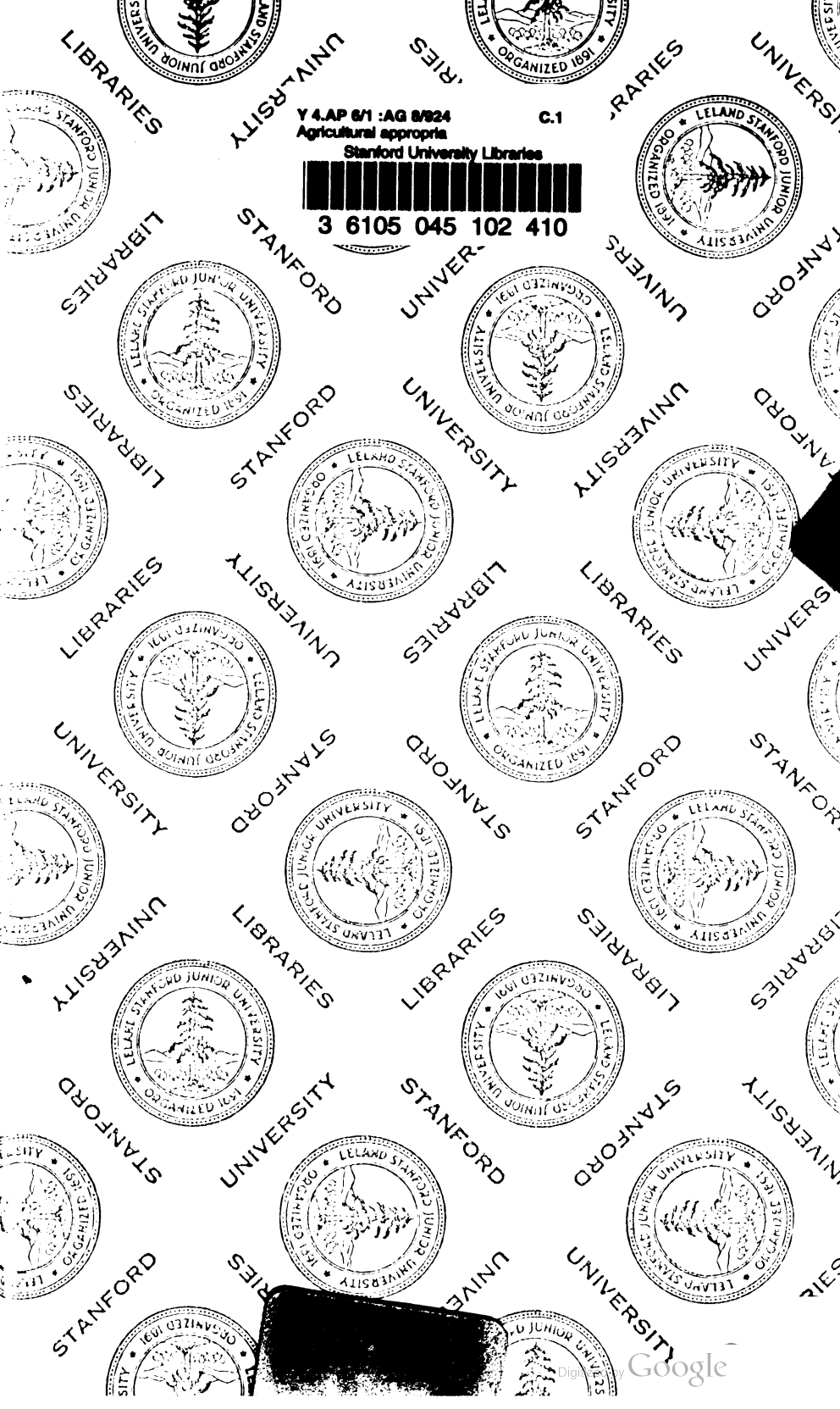
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